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CONTENTS

For complete table of contents see advertising page V

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AMERICAN JOURNAL OF OPHTHALMOLOGY

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DIVERGENCE EXCESS

Its frequency; its correlation with refraction; and the value of orthoptic treatment

CONRAD BERENS, M.D., F.A.C.S., LE GRAND H. HARDY, M.D., AND ELIZABETH STARK, A.M.

NEW YORK

The literature with regard to divergence excess shows great variance of opinion as to its frequency, its relation to refractive errors, and its treatment. In the private practice of ophthalmology the authors found it to occur in one to two per cent of all cases. It did not appear to be correlated with refraction. Orthoptic treatment proved frequently of great value, and in some cases obviated the necessity for operation. Read before the annual meeting of the American Ophthalmological Society, June 12, 1929.

A review of the literature concerning the condition known as divergence excess revealed wide variance of opinion regarding almost all the factors connected with it. By some it was reported as very common, by others as rare; by some as showing positive correlation with refractive errors, by others as being entirely unassociated with refraction; by certain writers as causing many and distressing symptoms, by still others as rarely exhibiting subjective signs. Its treatment especially is the subject of dispute. Orthoptic treatment has its zealous proponents, with equally competent students disclaiming for it any value. Nor is there unity of opinion on either side of this schism. Nonsurgical therapy varies greatly in its scope, technique, and claims. Likewise the surgeons differ as to the method and point of attack.

We have endeavored, in reviewing over eleven thousand case records from our private practises, to determine as exactly as possible the answers to several disputed questions. The information derived from our review is the basis of this report. All cases here reported have been examined by more than one ophthalmologist and method.

Scope: While many interesting questions presented themselves, a review of our data after they had once been assembled revealed their inadequacy in several directions. We have had no experience, for example, in the treatment of this condition by prescribing minus spheres; we have used prismatic lenses only on rare occasions; and our surgical data are not extensive enough to evaluate convincingly and objectively the various surgical procedures. They do, however, justify an expression on three phases of the condition, namely its frequency, its correlation with refraction, and the value of orthoptic training; and these will be given.

Definition: We characterize as divergence excess that ocular muscle imbalance exhibiting an exophoria more marked when the gaze is directed into distance than when it is adjusted for near vision, combined with normal prism convergence and near point of convergence and an excessive ability to overcome the diplopia caused by prisms placed base in before the eyes. The lateral movements of each eye should be normal and comitant.

Incidence: There is a wide variety of opinion as to the incidence of divergence excess. Reference to table 1 shows the majority of published statements.

Table 1

TABULATION OF PUBLISHED OPINIONS CONCERNING DIVERGENCE EXCESS

Author	Frequency	Correlation with refraction	Value of exercises	Primary treatment	Final treatment
Wootton[1*]	Very common	+hyperopia	Slight	Correct refraction	Tenotomy repeated
Wilkinson[4]				Prism in lens, exercises	Tenotomy if above 5°
Reber[5]	Common		Very valuable in 75% exophorias	Exercises, prism in lens	Tenotomy
Young[6]	Rare, 1.8% of refractions	+hyperopia	Valuable	Minus spheres, exercises	Recession
Bulson[7]			Very valuable	Exercises (prolonged)	Advancement or resection
Lauder[8]			None	Prism in lens	Tenotomy (early)
Duane[9]	Common, 33% of exophoria	None?	Very valuable	Orthoptic	Tenotomy, will require exercises as well
Dunnington[11]	Common	None	None	Tenotomy, repeated	
Maxwell[13]		Doubtful	Frequently valuable	Orthoptic	Tenotomy
Allen[14]			Valuable and permanent	Orthoptic	Surgical

* Number in bibliography.

Wootton[1, 2, 3] describes it as being "very common—at least in New York City. By far the largest number of divergent squints" he says "are due primarily to a divergence excess, usually associated with hypermetropia in one eye or in both."

Reber[5] thinks it is common. Duane[9] said: "A considerable number of cases of exophoria, probably a third, in fact, of all the cases that we see are due primarily to what I call divergence excess." Dunnington[12] concludes that it is a common condition. Young[6], on the other hand, finds it relatively rare—1.8 per cent of 905 refractive cases.

Table 2 indicates the frequency of the condition as we have found it. Two methods were used to check this finding. Among 11,500 serial cases coming for treatment for all conditions in the private practice of ophthalmology there were found cross-filed as divergence excess 114 cases—an incidence of 0.993 per cent. Examining every tenth record in an alphabetic file containing 10,000

Table 2

FREQUENCY OF OCCURRENCE OF DIVERGENCE EXCESS IN THE PRIVATE PRACTICE OF OPHTHALMOLOGY

Divergence excess frequency	
Among 11,500 serial cases in private practice there were found 114 cases of divergence excess cross-filed	0.993 per cent
Examining every tenth record among 10,000 serial records there were found 18 cases of divergence excess	1.8 per cent
The frequency, therefore, is put 1 to 2 per cent	

records, there were found eighteen cases of divergence excess—an incidence of 1.8 per cent.

In our experience, therefore, we put the incidence of divergence excess as met in the private practise of ophthalmology between one and two per cent.

Age incidence: We find in the literature no data correlating age with divergence excess—either as an associated condition or as a phase of onset. In our collected cases we have the ages (not of onset but at the time of first visit) of ninety-two patients. The distribution varies from four to sixty-three years. Figure 1 indicates the age incidence as we find it, and the entire lack of correlation.

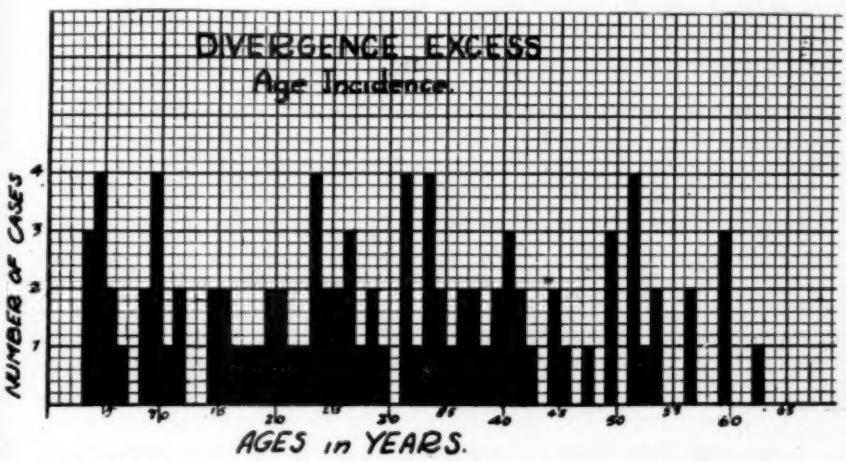

Fig. 1 (Berens, Hardy, and Stark). Age incidence of ninety-two cases of divergence excess.

Correlation with refraction: Is divergence excess a refractive condition? Does it have its origin in an error of refraction? Is it positively associated with ametropia? Wootton[1, 2] says yes, and repeats that it is usually accompanied by hypermetropic refraction of one or both eyes. Young[6] finds exophoria correlated with hypermetropia generally. Duane[10] questions its association with refractive error. Dunnington[12] specifically says it is not refractive in origin. Maxwell[13] states that hypermetropes predominate in cases of divergence excess, and myopes in convergence insufficiency. In this he agrees with Wootton.

Our data are classified from two sources. First, a group of twenty-two completely worked-up cases. These were seen many times and carefully rechecked. Secondly, a group of eighty cases. In this group the diagnosis had been verified but the patients did not remain long enough under observation to furnish reliable data for therapeutic tables. All patients were examined under cycloplegia. The refractions were checked one or more times by different observers. Figure 2 indicate our results.

It will be seen that in the smaller group compound myopic astigmatism predominates, but that in the larger group the refraction of one or both meridians in one or both eyes is about equally distributed. Cases of antimetropia or mixed astigmatism were divided equally between the two groups, myopic and hyperopic. We therefore find no significant correlation with ametropia of any type.

Up to this point we feel that our data are valid and explicit. We know of no greater group of authenticated divergence excess cases which have been collected and classified. The question of therapy, however, narrows our ground considerably, as in dealing with this phase of the condition we prefer to discuss that smaller group of cases

which have been thoroughly studied, diagnosed, and checked, and whereof we have more specific, accurate information. The follow-up on this group extends from two months to eight years, and of the character and extent of cooperation we feel fairly sure.

Orthoptic exercises and divergence excess: What is the value of orthoptic exercises in divergence excess? Here opinion is most positive, emphatic, and diverse.

Wootton[1, 2] concedes but slight value for this form of treatment. Reber[5] believes exercises are valuable. "In over 200 cases of exophoria of both types we have resorted to exercises alone, and have been gratified at the results obtained in 75 per cent of the cases." He stipulates, however, that the prisms must be held in a frame, and never uses the loose square prisms to which we are accustomed. Young[6] grants the value of exercises, but primarily bespeaks the use of minus spheres to stimulate accommodation. Bulson[7] quite emphatically believes in the efficacy of prism exercises with prolonged, conscientious, and increasing effort. He holds them to be beneficial in a large percentage of cases. Lauder[8] admits little, if any, value for this form of treatment. Duane[9, 10] stanchly defended orthoptic exercises, and stated that no operation should be done until all other means had been thoroughly tried and failed and unless the symptoms were severe and likely to be permanent. In discussing Duane's paper Souter gave his opinion that prism exercises were not rational or of the slightest value outside of psychic effect. Dunnington[11, 12] disclaims any value for exercises; we believe he means they do not produce a permanent effect. Maxwell[13] found exercises frequently valuable, and Allen[14] believes strongly in their value and the permanence of their effects. Having used them for years with accurate records he has found that the benefits are permanent and that clear single vision is maintained if the orthoptic treatment has been carried far enough to secure muscular balance. Wells, as is known, has produced remarkable results with orthoptic exercises.

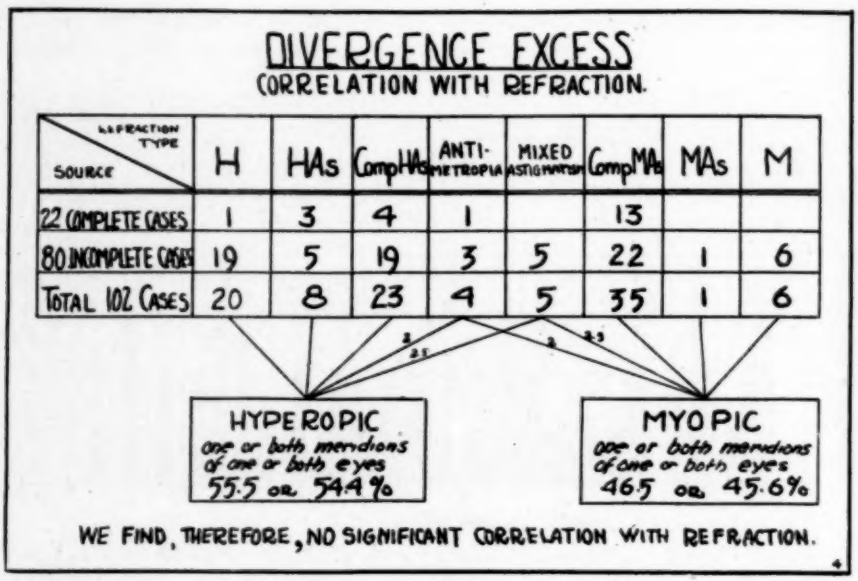

Fig. 2 (Berens, Hardy, and Stark). The correlation of divergence excess with types of refraction.

Table 3 shows the results of treatment of our twenty-two cases. Nineteen were treated orthoptically, three surgically. Of the nineteen, sixteen

Table 3

RESULTS OF TREATMENT IN 22 CASES OF DIVERGENCE EXCESS

Type of treatment	Cured		Improved		No change		Total
	symptomatically	objectively	symptomatically	objectively	symptomatically	objectively	
Orthoptic	14	10	2	9	3	0	19
Surgical	2	1	1	2			3

were cured or improved symptomatically and three showed no change. Objectively all were modified, but the percentage of cures—that is orthophorias—was less than that of the symptomatic cures.

With due regard to the small number of cases reported in this table, we believe a significant percentage showed results favorable to nonsurgical treatment.

Relation of refraction to efficacy of treatment: What type of patient responds best to orthoptic treatment? Is there a correlation between refraction and efficacy of treatment? We have not seen this point discussed. There is an increasing trend toward the treatment of convergence insufficiency by graduated convergence exercises. This condition and its treatment have been widely discussed. In an analysis of 1300 cases of squint Maxwell[13] found that divergent squint when associated with hyperopia tended to assume the character of divergence excess, and when associated with myopia to assume the character of convergence insufficiency. If convergence insufficiency is successfully treated with exercises then the oblique thought suggests itself that of the divergence excess cases those associated with myopia might be more amenable to treatment by this method.

Wootton[1] states that divergent squint has three etiologies. In order of their frequency, at least in New York City, they are: (1) divergence excess (hypermetropia frequent, myopia rare); (2) convergence insufficiency (myopia frequent, hypermetropia rare); (3) divergence excess marked and convergence insufficiency (antimetropia frequent); Cure by nonsurgical means may be expected only in the convergence insufficiency (myopia frequent, hypermetropia rare) cases. Again the suggestion that the myopic patient with divergence excess may more hopefully undertake orthoptic treatment. The results of treatment of our twenty-two cases classified according to refractive type are shown in table 4.

It will be noted that the high objective percentages show hyperopes improved, while the high subjective percentage is that of myopes cured. It must also be noted that this table includes the three cases surgically treated (all hypermetropes) and that a revision

Table 4

DIVERGENCE EXCESS: IS THERE A CORRELATION BETWEEN REFRACTION AND EFFICACY OF TREATMENT

		Myopes		Hypermetropes		Antimetropes	
		Number	Per cent	Number	Per cent	Number	Per cent
Cured	symptomatically	10	77.0	5	62.5	1	100
	objectively	8	61.5	1	12.5	1	100
Improved	symptomatically			3	37.5		
	objectively	5	38.5	7	87.5		
No change	symptomatically	3	23.0				
	objectively						
Totals		13		8		1	

to eliminate these three cases would increase the percentage contrast, that is, the percentage column under hypermetropes would read 60 per cent subjectively cured, none objectively cured, 40 per cent subjectively improved, and 100 per cent objectively improved. The same data, differently treated, are shown in table 5, where the percentages are arranged in decreasing order.

Table 5

PERCENTAGE RESULTS OF TREATMENTOF DIVERGENCE EXCESS IN MYOPIC AND HYPERMETROPIC PATIENTS

		Cured	Improved	No change
Symptomatic	Myopia	77.0%		23.0%
	Hyperopia	62.5%	37.5%	
Objective	Myopia	61.5%	38.5%	
	Hyperopia	12.5%	87.5%	

Inspection here suggests that a myope shows more likelihood of being cured than a hyperope, and that a symptomatic cure in either case is more frequent than an objective cure. Also a myope has a better chance of being cured subjectively or objectively, and less chance of being only improved. Conversely, a hyperope shows more likelihood of being improved (temporarily?) and less likelihood of a cure. Hence in this short series, our myopes predominating (13 to 8), our results will probably be more encouraging than these reported. It is noted that all our operative cases were hypermetropes.

Retaining these inferences, we are reminded by a view of Fig. 2 (short series) that we are here dealing with a group predominantly myopic and hence most favorable for orthoptic treatment. The inadequacy of the eighty records for therapeutic statistical analysis may indicate either that the treatment was immediately successful and permanent or that it was quite ineffective and the patients wandered elsewhere.

The data in hand are, however, sufficently impressive to us to warrant presentation, for the following reasons: (1) The condition is not acute; immediate operation is not imperative. If only a small percentage of these cases are cured by nonsurgical means the result is worth the effort. (2) We insist on exercises in every case because, whether surgery will be required or not, the development of the fusion habit and increase in amplitude of disjunctive ocular movements builds up a resistance to fatigue and increases the assurance of successful surgery.

We agree most heartily with Duane's statement[9] that operation should not be performed unless all other means have been thoroughly tried and have failed, and that even if an operation is performed, the patient should be given the advantages of the adjuvant treatment as well. The necessity for operation both in this condition and in convergence insufficiency we have found definitely diminished as a result of conscientious orthoptic treatment. As illustration of what may be achieved by nonsurgical treatment of divergence excess the significant data from seven records are presented in table 6.

It will be seen that in a condition as marked as that in case no. 1 with exotropia of forty prism diopters at six meters, much can sometimes be done. It was decided at the time of the first visit that this patient would require an operation, and bilateral retroplacement was advised. The exercises were prescribed as a matter of preoperative routine in order to insure, as far as possible, a good surgical result, and to facilitate early postoperative fusion training. After eight years without operation the patient not only has normal muscle balance using either screen or multiple Maddox rod test, but also an assured

TABLE 6: TABULATED RESULTS IN SEVEN CASES

TABLE 6: TABULATED RESULTS IN SEVEN CASES

No.	Initials	Age	Refraction	Per cent	Muscles				Diagnosis	Treatment	Duration of treatment	Results						Subjective
					Balance		Strength					Objective						
												Muscles						
													Balance		Strength			
					6 m.	25 cm.	6 m.	25 cm.				cent	6 m.	25 cm.	6 m.	25 cm.		
1	S. K. W.	4	Compound myopic astigmatism	50	X^{t}40	X′10	D45 No. C	D′— C′18	Divergence excess.	Converging exercises pin and prism Stereoscope. Advise recession.	8	30	Orthophoria (Maddox rod and screen)	X′5	C100	C′100		No symptoms
2	B. C.	11	Compound myopic astigmatism	..	X^{t}20	X′^{t}16	..	..	Divergence excess. Secondary convergence insufficiency.	Converging exercises light. Stereoscope and prisms. Amblyoscope.	4 years	30	Orthophoria	Orthophoria	D12 C80+	D′25 C′80+		No symptoms
3	E. W.	32	Compound myopic astigmatism	100	X^{t}20	X′20	..	D′25	Divergence excess. Secondary convergence insufficiency.	Converging exercises light. Converging exercises prisms.	months	70	E1	X′2	D8 C80	D′18 C′80		No symptoms
4	A. M.	10	Compound myopic astigmatism	30	X^{t}20	X′30	..	D′28 C′30	Divergence excess.	Converging exercises prisms. Converging exercises dot.	18 months	35	X3	X′15	C150	C′150		No symptoms
5	F. C.	33	Compound myopic astigmatism	80	X10	X′18	D15 C9	D′20 C′35	Divergence excess. Secondary convergence insufficiency.	Converging exercises prisms. Converging exercises dot. Accommodation exercise.	2 months	55	X6	X′18	D20 C80	D′20 C′90		No symptoms
6	W. A.	9	Compound myopic astigmatism	60	X^{t}20	X′30	..	..	Divergence excess. Secondary convergence insufficiency.	Converging exercises light. Pin and prisms. Amblyoscope.	4 years	30	X20	E′6	D10 C100	D′15 C′100		No symptoms
7	A. A.	10	Antimetropia	45	X15	X′18	D17 C10	D′18 C′12	Divergence excess. Secondary convergence insufficiency.	Converging exercises prisms. Stereoscope.	4 months	35	Orthophoria	Orthophoria	D15 C50	D′16 C′60		No symptoms

Abbreviations:

X = Exophoria
E = Esophoria
X^t = Exotropia
E^t = Esotropia
C = Converging power
D = Diverging power
Prime (′) indicates near point test

reserve of convergence strength. There are no symptoms. There is no limitation of use of her eyes. Distance vision under trying conditions (motoring, train riding, and moving pictures) produces no symptoms, nor do intensive near point fatigue tests. The most trying of these of which we are aware is the ophthalmic ergograph, and her performance with this instrument was perfect. Her ergograph record recently made is shown in figure 3.

Fig. 3 (Berens, Hardy, and Stark). Ergograph record of patient no. 1 (table no. 6).

Convergence was well sustained, repeated efforts showed no diminution in amplitude, and no symptoms were produced in the ten-minute period usually allotted.

Case no. 2 likewise was considered purely surgical at first. Exotropia both for distance and near indicated a marked degree of secondary convergence insufficiency. After three weeks with the stereoscope and amblyoscope the findings were those of pure divergence excess. All the signs of this condition have now disappeared with one exception (diverging power of twelve prism diopters at six meters). There are no symptoms. The ergograph record is too long to be conveniently reproduced.

Case no. 6 parallels this in everything but progress. The objective findings are still those of divergence excess. Subjectively there are no symptoms, nor does the ergograph elicit any. (Fig. 4) This patient has had a convergence excess superimposed on his divergence excess. Functionally his ocular muscles are normal.

Fig. 4 (Berens, Hardy, and Stark). Ergograph record of patient no. 6 (table no. 6).

Conclusions

1. Divergence excess occurs in the private practice of ophthalmology (in New York City) in one to two per cent of all cases.

2. It is not correlated with refraction.

3. Orthoptic treatment is frequently of great value and in some cases obviates the necessity for operation. It should be tried in every case primarily, and in those cases ultimately requiring surgery it should be continued as an adjuvant treatment to insure the best possible result.

30 East Fortieth street

Bibliography

[1] Wootton, H. W. Divergent comitant strabismus; the muscular anomalies and refractive errors accompanying it and its treatment. Ophthalmoscope, 1916, v. 14, p. 236.
[2] Wootton, H. W. Nonsurgical treatment of heterophoria in ametropia. Arch. of Ophth., 1925, v. 54, pp. 440-442.
[3] Wootton, H. W. The present status of squint and ocular-motor imbalance. New York State Jour. Med., 1915, v. 15, p. 56.
[4] Wilkinson, O. Exophoria; its symptoms, significance and treatment. Washington Med. Annals, 1909, v. 8, May, p. 104.
[5] Reber, W. The present status of the heterophoria question. Ophthalmoscope, 1914, v. 12, pp. 456, 592, 644.
[6] Young, C. A. Exophoria, analysis and treatment of 167 cases. Virginia Med. Monthly, 1926, v. 53, April, pp. 25-27.
[7] Bulson, A. E. Discussion of divergence excess. Jour. Indiana State Med. Assoc., 1926, v. 19, p. 107.
[8] Lauder, E. Exophoria, with some reference to its causes, reflex disturbances and treatment. Cleveland Med. Jour., 1910, v. 9, Oct., p. 768.
[9] Duane, A. Convergence insufficiency. Jour. Amer. Med. Assoc., 1914, v. 63, p. 721.
[10] Duane, A. Motor anomalies of the eye. Jenkins and Co. New York, 1910.
[11] Dunnington, J. Concomitant divergent strabismus. Amer. Jour. Ophth., 1927, v. 10, p. 490.
[12] Dunnington, J. Divergence excess; its diagnosis and treatment. Arch. of Ophth., 1927, v. 156, p. 344.
[13] Maxwell, E. M. Concomitant squint in the practise of the late P. W. Maxwell. Brit. Jour. Ophth., 1919, v. 3, pp. 340-349, 408-420.
[14] Allen, S. B. Discussion of Wootton's[3] paper. New York State Jour. of Med., 1915, v. 15, p. 60.

THE BLIND SPOT

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The following aspects of the subject are especially considered: the anatomy of the optic nerve and more particularly of the papillomacular bundle; the relationship of the blind spot to various disorders, among which are included glaucoma, toxic amblyopias, accessory sinus disease, and choked disc; indications for and methods of examining the blind spot. Read before the Chicago Ophthalmological Society, April 15, 1929.

1. History

In 1668 Mariotte[1] published the description of the first method of examination of the blind spot, the early English translation of which I shall quote in full:

"Having often observed in anatomical dissection of men as well as brutes, that the optick nerve does never answer just to the middle of the bottom of the eye, i.e., to the place where is made the picture of the objects we directly look on, and that in man it is somewhat higher and on the side toward the nose; to make, therefore, the rays of an object to fall upon the optick nerve of my eye, and to find the consequence thereof, I made this experiment: I fastened on an obscure wall, about the height of my eye, a small round paper, to serve me for a fixt point of vision; and I fastened such another on the side thereof towards my right hand, at the distance of about two feet; but somewhat lower than the first, to the end that it might strike the optick nerve of my right eye, while I kept my left shut. Then I placed myself over against the first paper and drew back little by little, keeping my eye fixt and very steady upon the same; and being about ten feet distant the second paper totally disappeared."

Following the controversy which the publication of his experiment brought on, more than a century and a half passed before any further mention of the blind spot appeared in the literature. The next important publication occurred in 1856, when Graefe[2] mentioned an enlargement of the blind spot occurring in amblyopic affections. Coccius[3] and next Bjerrum[4] mentioned the defect of the blind spot as pathognomonic of glaucoma. In 1869 Leber[5] published an account of a similar phenomenon, which was later substantiated in Wilbrand and Sänger's book[6]. In 1903 Cantonnet[7] mentioned the important prognostic points regarding the malignancy of myopia from examination of the blind spot. Several authors later reported enlargement of the blind spot due to medullated nerve fibers. In 1909 van der Hoeve[8] made a diagnosis of optic nerve involvement from posterior ethmoiditis by demonstrating an enlargement of the blind spot.

2. Anatomy of the blind spot and surrounding retina

Mariotte recognized that the presence of the blind spot was due to an area within the eyeball incapable of light perception. In 1852 Donders[9] proved that the blind spot corresponded to the entrance of the optic nerve into the eyeball. He also calculated the size of the entrance of the optic nerve into the eye, which corresponded with the anatomic measurements. Salzmann[10] estimates it to vary from three to three and one-half millimeters.

In 1869, Leber spoke of the nerve fibers from the macula passing backward through the nerve and lying directly under the vaginal sheaths. In the same year Förster[11] hinted at the axial location of the fibers from the macula, the papillomacular bundle. In 1882 Samuelsohn[12] obtained the nerves from a case of toxic amblyopia with normal peripheral fields, but large central scotoma involving the blind spot, and, after careful serial sectioning and staining, he outlined the course of the papillomacular bundle and suggested the course of the fibers from that

part of the retina immediately surrounding the disc.

To Fuchs[13] belongs the credit of localization of the fibers from the retina immediately around the disc, the peripapillary fibers. He stated that the peripheral bundles, lying immediately underneath the pia, supplied the retinal areas surrounding the disc. Thus any interference with the peripheral bundles would result in enlargement of the blind spot. This was agreed to by Berger[14].

The intraneural course of the optic nerve bundles may be outlined as follows:

The papillomacular bundle enters the nerve on the temporal side as a V-shaped sector, coming to a point in the center. It passes backward, assuming a more cylindric form, and at the junction of the vascular and avascular portions of the nerve no longer lies in the periphery, nor does it reach to the center. As the canalicular portion of the nerve is approached, the bundle flattens and gradually becomes crescentric, lying in apposition within the bony canal with the vena centralis nervi optici posterior. The peripapillary bundles, composed of fibers from the retina immediately around the disc, lie in the periphery of the optic nerve directly underneath the pia, throughout its entire course.

3. The anatomic relations of the optic nerve

The vascular portion of the nerve, about fifteen millimeters in length, lies free in the orbit and in contact only with the surrounding orbital fat. The avascular portion of the nerve also lies free in the orbit, but is in rather intimate relationship with the ophthalmic artery and vein, which are to be found below and to the temporal side of the nerve. Thus these portions of the nerve are not apt to be affected by any disease except purulent inflammation of the orbit which would be of such violence as to eliminate any observations upon the blind spot.

According to Onodi[15] there are six main types of relation between the posterior accessory sinuses and the optic canal:

1. The two optic canals are formed by sphenoid cells, on both sides.
2. Both optic canals are in relation only with the most posterior ethmoid cells.
3. One optic canal is bounded by a sphenoid and the other by a posterior ethmoid cell.
4. Either optic canal alone may be in relationship with a posterior ethmoid or a sphenoid cell.
5. The optic canal may be in contact with both sphenoid and posterior ethmoid cells.
6. The optic canal may be in relationship with neither posterior ethmoid nor sphenoid cells.

Both Onodi and Loeb[16] emphasize the intimacy of the sphenoid and posterior ethmoid cells with the optic nerve as important in explaining affections of the optic nerve due to sinus disease. Personally, we do not agree with either author, but believe that the relationship of the soft tissues in and around the optic canal plays the important rôle in this disease.

Vossius[17] first described the blood supply of the optic nerve and its sheaths. The vascular portion of the nerve and its sheaths are, of course, supplied by the central artery of the retina and by the accompanying vein.

These anatomic facts explain the course of disease from the accessory sinuses to the optic nerve. The infection, the edema, or whatever may be the disturbing factor, passes from the sinus periosteum through the diploic veins and lymph channels to the orbital periosteum, thence by continuity to the intracanalicular portion of the dura of the optic nerve, or possibly through the periosteal veins or dural veins directly to the central vein of Vossius. If the dura alone is involved, thus causing pressure upon the periphery of the optic nerve within the canal, the peripapillary bundles alone will be involved and enlargement of the blind spot will result. If the process extends further and involves the central vein of Vossius, surrounding it by an edema, the neighbor-

ing nerve bundles will suffer. These happen to be the papillomacular bundles, and there results a central scotoma. Consequently, we believe that we are justified in stating that the anatomic relations of the sphenoid and ethmoid cells to the optic canal are immaterial when it comes to a question of optic nerve involvement in accessory sinus disease. The trouble is transmitted by the soft tissues alone.

4. Pathologic significance of the blind spot.

A. The blind spot in myopia: Cantonnet measured the size of the blind area in thirty-five cases of myopia of varying severity, and repeated the measurements after three years. The malignant cases showed an enlargement of the blind spot toward the point of fixation, and, as the myopia increased in severity, the internal edge of the spot advanced.

Bjerrum came to the same conclusions after examination of a smaller number of cases. He emphasized that the enlargement of the blind spot in myopia was due to peripapillary atrophy.

Our own observations upon the blind spot in myopia have been limited as to the number of cases examined, but we have found that, contrary to expectation, the enlargement of the blind spot did not coincide with the ophthalmoscopic picture.

B. The blind spot in glaucoma: Coccius described, in addition to the true blind spot, secondary smaller blind areas, usually in continuity with the main area, and believed them to be pathognomonic of glaucoma.

By means of his tangent screen Bjerrum investigated the visual fields in glaucoma with special reference to the Mariotte region. He found that scotomata here are apt to be present around the blind spot, usually in association with a marked sector-shaped defect in the temporal fields. From these investigations he concluded that a peripheral defect, extending from the temporal side into the region of the blind spot, was pathognomonic of glaucoma. In commenting upon this statement Sinclair[18] added that in glaucoma the area of most acute vision and the area of relative defect (sector-like defect in the temporal segment of the field) might be said to meet at the blind spot. Priestley Smith[19] insists upon an investigation of the blind spot in every case of suspected glaucoma.

C. The blind spot in relation to medullated nerve fibers: In a previous communication Gradle[20] came to the following conclusions:

(1) Medullated nerve fibers in the retina adjacent to the disc cause enlargement of the blind spot.

(2) The enlargement of the blind spot found in such cases seldom corresponds in size or shape to the ophthalmoscopic picture of the medullated area.

(3) The disparity between the size and shape of the blind spot and the ophthalmoscopic picture of the mass of medullated nerve fibers indicates that medullated nerve fibers within the retina are not opaque to incident light for the entire length of the medullation, and that the degree of opacity can not be deduced from the ophthalmoscopic picture.

(4) In such cases, the enlargement of the blind spot indicates merely the amount of retinal area that is prevented from functioning by the presence of overlying medullated nerve fibers in a layer sufficiently thick to occlude incidental light.

(5) The term "opaque nerve fibers" is a misnomer and should be discarded for the proper term "medullated nerve fibers".

D. The blind spot in sympathetic ophthalmia: Enlargement of the blind spot in five cases of sympathetic irritation was reported by Sutherland and Maitland Ramsey.[21] They found a spindle-like enlargement of this area above and below the horizontal meridian, while the lateral aspects of the blind spot were practically normal. No central scotomata were present. These enlarged blind spots gradually became

normal in size. Similar cases have also been reported by other authors.

E. The blind spot in eclipse blinding: Epeleers[22] made an exhaustive study of thirteen cases of eclipse blinding during the summer of 1912. In six of these cases he found a ring scotoma. In eleven of the thirteen cases there was a slight enlargement of the blind spot, not proportional to the other clinical phases of the disease.

F. The blind spot in toxic amblyopia: Graefe, in 1856, first described an enlargement of the blind spot as a clinical feature of toxic amblyopia, but Leber in 1869 was the first to describe the condition accurately. Wilbrand and Sänger later made the statement that "the bilateral relative scotoma of oval form, embracing the blind spot, must be regarded as pathognomonic of intoxication by alcohol or tobacco".

Clinicians are reasonably agreed that the diagnostic feature of a tobacco or alcohol amblyopia is a relative central scotoma that may or may not include the blind spot. The disease is unquestionably due to a toxemia of the bundles within the optic nerve proper. Combined involvement of the peripapillary and papillomacular bundles seems to be a matter of chance. If any enlargement of the blind spot does occur, it is apt to be irregular, both as to size and direction. But the inevitable central scotoma is greater toward the temporal margin of the field, infringing frequently upon the blind area.

G. The blind spot in optic nerve involvement from accessory sinus disease: Fuchs[23] and Mendel[24] were first to recognize retrobulbar neuritis as due to disease of the accessory sinuses. These authors found that a central scotoma, usually absolute, was one of the early and important diagnostic signs of this disease. Many later publications confirmed their findings.

Van der Hoeve, in 1909, again called the attention of the ophthalmologic world to the blind spot by reporting a case of retrobulbar neuritis due to ethmoid and sphenoid suppuration and diagnosed by enlargement of the blind spot. Exenteration of the sphenoid resulted in very slow improvement with ultimate disappearance of the enlargement of the blind spot, but persistence of the central scotoma.

Van der Hoeve stated definitely that enlargement of the blind spot occurred only when the optic nerve was attacked from the sphenoid or posterior ethmoid cells; sinusitis of the frontal, anterior ethmoid, or maxillary alone seldom, if ever, caused this symptom.

H. The blind spot in choked disc: In a recent publication Davis[25] states that it seems obvious that the explanation for the increase in the size of the blind spot in the presence of increased intracranial pressure resides in the demonstrable fact that the layer of rods and cones is pushed aside by the edematous nerve head. This can be shown both clinically and experimentally. It also seems entirely logical that decrease in the size of the blind spots follows the subsidence of edema and the return of this layer of the retina to its normal position. Davis is also of the opinion that records of the size of the blind spot are of greater value in determining and following the increase or decrease in papilledema than are ophthalmoscopic measurements of the height of swelling of the optic nerve heads.

5. Indications for examination of the blind spot

(1) Whenever the vision can not be improved to normal by correcting lenses, no cause for this phenomenon being evident.

(2) When there is a history of headache or nasal trouble, chronically inflamed eyelids or conjunctivæ, or congested eyes that do not improve rapidly under treatment. These symptoms and physical signs should lead one to suspect sinus involvement, particularly when accompanied by retrobulbar tenderness.

(3) When dacrocystitis or stenosis of the nasolacrimal duct is present,

since these conditions are frequently accompanied by sinus disease as an etiologic factor.

(4) When glaucoma is present or suspected, or disease or anomalies of the deeper structures of the eye, particularly when the optic nerve is involved.

(5) In cases of high myopia, especially when malignant myopia is suspected.

6. Size and location of the blind spot, and methods of measuring it

The position and dimensions of the blind spot vary according to the individual examiner and his technique. A brief outline of the reports of several observers reveals the following data:

(1) nasal border from the point of fixation

(2) temporal border from the point of fixation

(3) height of blind spot above point of fixation

(4) distance of blind spot below point of fixation

(5) horizontal diameter

(6) vertical diameter

In searching for the blind spot it is only necessary to remember that it is usually found between 12.5 degrees and 18.5 degrees temporal to the point of fixation, and slightly below the horizontal.

The size of the blind spot is dependent upon

(1) type of apparatus used

Observer	Distance from fixation point	Distance of center below horizontal	Vertical diameter	Horizontal diameter
Van der Hoeve	15° 33′ 47″	1° 40′ 41″	7° 26′	5° 42′ 55″
Peter	15° 49′	1° 30′	7° 40′	5° 28′
Traquair	15° 27′ 36″	1° 24′	7° 17′	5° 7′ 5″

In a recent publication Gradle gave the statistics of the composite normal blind spot measured at a distance of sixty centimeters as follows:

(1) The exact center lies 17.13 centimeters from the point of fixation—16 degrees, 33 minutes, 32 seconds.

(2) The internal border lies 14.13 centimeters from the point of fixation—13 degrees, 15 minutes, 35 seconds.

(3) The external border lies 19.68 centimeters from the point of fixation—18 degrees, 9 minutes, 35 seconds.

(4) Thus the horizontal diameter of the blind spot measures 5.55 centimeters; or 4 degrees, 54 minutes.

(5) The uppermost border extends 3.223 centimeters above the horizontal line of fixation—2 degrees, 58 minutes.

(6) The lowermost border extends 5.169 centimeters below the horizontal line of fixation—4 degrees, 47 minutes.

(7) Thus the vertical diameter of the blind spot measures 8.393 centimeters—7 degrees, 45 minutes.

In determining the average normal blind spot, it may be useful to make the following measurements:

(2) facial asymmetry (particularly vertical orbital)

(3) mental reaction time (quick or slow)

(4) distance from point of fixation

(5) method of signalling, voice or mechanical, for example a light

(6) size of test object

(7) type of test object

(8) vision, with correction

(9) whether or not correction is worn during test

(10) Whether test object is stationary or moved, and whether findings are the mean of the in and out motion.

(11) lighting—daylight or artificial, and its intensity

(12) apparent size of the nerve and any abnormalities

(13) the influence of fatigue

The amblyopic zone

This narrow marginal band of relative blindness surrounding the blind spot was originally demonstrated by Bjerrum. Its width and intensity are not yet definitely established. Sinclair, using a 1 mm. white object at

2 meters (V.A. = 1.7′) found this zone to be approximately 1° wide, and also demonstrable with colors. Van der Hoeve, using larger visual angles, found a zone of one-eighth to one-quarter degree of relative blindness for white, and one-eighth to three quarters degree of relative blindness for colors. Haycraft, who used colors of equal luminosity, found a much wider area of modified color perception. In this amblyopic zone he found that colors when moved centrifugally from the blind spot were recognized in the order blue, yellow, and green, and lastly red, the same colors being perceived in the same order when moved inward at the periphery of the field. Thus the outer periphery of the field corresponds in this respect to the margin of the blind spot. Haycraft does not state the visual angles used.

Traquair's [26] observations agree with those of Sinclair. Using the screen at two or four meters, the blind spot first being marked out with a 10 or 20 mm. object, the amblyopic zone is easily demonstrated with a one or two millimeter white test. With these visual angles it is rarely wider than one degree except at the upper and lower margins of the blind spot. The discrepancies found by various observers are attributable to the different methods of examination used.

Methods of measuring the blind spot

A. The confrontation test. Since the discovery of the blind spot, many methods of examination have been proposed. The most important factor in delimitation of the blind spot after the radius has been adjusted is steadiness of fixation. These factors are controlled by the confrontation test with a meter string, and by this method patients may frequently be shown that they have a blind spot, after which it becomes possible to outline it by one of the recording methods. The following method of outlining the blind spot by the confrontation method proves particularly useful for neurologic patients, whose fixation is frequently difficult to control. The patient holds the end of the meter string on a level with the right eye, while the observer holds the other end on a level with his own eye. The eye not under examination is covered, and a white headed pin or point of light is tied or passed through the string at 50 centimeters, and carried temporally slightly below the horizontal, eye fixating eye, until the blind area is found and compared with that of the observer.

B. Peter's hand campimeter. The Peter[27] hand campimeter is a useful instrument for bedside and office examinations, an apparatus of this type being desirable, particularly if the charting can be done directly on a card for reference purposes. The E. B. Meyrowitz modification may be employed as a rotary or a stationary campimeter. The rotary feature is used by Elliot for the study of paracentral scotomas extending from the blind spot.

C. Gradle's[28] modification of the Bjerrum screen. Gradle uses a dull-white, round celluloid screen, fifty centimeters in diameter, forming a solenoid by electrical connections, with two jointed arms bearing steel pencils posterior to the screen, so arranged that blue steel ball bearings on the anterior surface of the screen are carried along, held there by the magnetic force imparted to the pencil. The patient's eye is sixty centimeters from the screen. The patient uses an electric test lamp to flash signals when the test mark appears and disappears. This avoids a change in position of the patient, due to the muscular effort of speech.

D. The Bjerrum screen: The Bjerrum screen or one of its modifications is very useful for accurate work. We now use in our office a tangent screen, with the patient sixty centimeters from the point of fixation, and a one millimeter test object.

E. The Lloyd stereocampimeter. The Lloyd stereocampimeter is one of the best devices for studying the central visual field for scotomas, but is not so accurate for examination of the blind spot.

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Bibliography

1. Mariotte. Nouvelles découvertes sur la vue, Paris, 1668. English translation in Philosophical Transactions, 1668, v. 3, pp. 668-669.
2. Graefe. Graefe's Arch., 1856, v. 2.
3. Coccius. Ueber Glaukomentzündung, etc., 1859
4. Bjerrum. Nordisk Ophth. Tidskrift., v. 2, no. 3.
5. Leber. Graefe's Arch., 1869, v. 15.
6. Wilbrand und Sänger. Neurologie des Auges, 1869.
7. Cantonnet. Arch. d'Opht., 1903.
8. Van der Hoeve. Arch. f. Augenh., 1909.
9. Donders. Onderzoek. Physiol. Lab., Utrecht, 1852, v. 6
10. Salzmann. Anatomy of the human eyeball, 1912.
11. Förster. Graefe-Saemisch, first edition, v. 7, chap. 13.
12. Samuelsohn. Graefe's Arch., 1882, v. 28.
13. Fuchs. Textbook of ophthalmology, 1905.
14. Berger. Soc. de Méd. Prat. de Paris, 1891, Dec. 31.
15. Onodi. Zeit. f. Augenh., 1904.
16. Loeb. Ann. Otol., Rhin., and Laryng., 1909.
17. Vossius. Graefe's Arch., v. 29.
18. Sinclair. Ophth. Review, 1905.
19. Smith, Priestley. Trans. Ophth. Soc. United Kingdom, 1906.
20. Gradle. Jour. Amer. Med. Assoc., 1921, v. 77, Nov. 5, pp. 1483-1486.
21. Sutherland and Ramsey. Ophth. Review, 1906.
22. Epeleers. Klin. M. f. Augenh., 1912, Nov.
23. Fuchs. Graefe's Arch., v. 31.
24. Mendel. Zentralbl. f. Augenh., 1901.
25. Davis, Loyal. Jour. Amer. Med. Assoc., 1929, v. 92, March 9, pp. 794-798.
26. Traquair. Clinical perimetry, 1927, p. 229.
27. Peter. A new hand campimeter, Ophth. Record, 1915, p. 331.
28. Gradle. Ann. of Ophth., 1915, Oct.

INTENSITY OF ILLUMINATION AND OTHER FACTORS INFLUENCING THE SENSITIVITY OF THE RADIAL TEST FOR ASTIGMATISM

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Great sensitivity may be added to the use of radial tests for astigmatism by conducting the tests at very high intensity of illumination. Black lines on white should present as great a difference as possible in the coefficient of reflection between the lines and their background. The illuminating light should also be of high intensity, the lines should be narrow, the incident light should be white, and the eye should be rendered as sensitive as possible to light discrimination by conducting the test under low general illumination.

In previous papers we have shown two ways in which intensity of illumination may play an important rôle in the sensitivity of tests for astigmatism. In the first of these[1] it was utilized as the means of measurement or detection of the astigmatism. That is, the inequality of resolving power in the different meridians was indicated by the difference in the minimum amount of light required to discriminate a given detail or visual angle in these meridians. This, so far as we know, is the most sensitive method of detecting small errors in the amount or placement of the correction of an astigmatism that has as yet been proposed. In the second[2], visual angle is used for the detection of inequalities of resolving power, but advantage is taken of the fact that much smaller differences in resolving power can be detected at low than at high illuminations. In short, in this procedure sensitivity is added to the conventional acuity method by conducting the test at very low illuminations.

It is one of the purposes of the present paper to show a third way in which sensitivity may be added to the testing for astigmatism by playing upon intensity of illumination as a factor. In this procedure charts of the radial line type are used. Great sensitivity may be added to the use of charts of this type by conducting the test at a very high intensity of illumination.

The principles involved in these tests are not difficult to understand. In the first, advantage is taken of the fact that acuity changes slowly with change of intensity of illumination; much more slowly, for example, than with change of size of object or visual angle. Larger changes of illumination than of visual angle correspond, therefore, to a given change in acuity. Thus, in comparison, the illumination scale becomes an amplified or magnified scale by means of which smaller differences in acuity can be detected in the meridians of the refracting media having differences in resolving power than can be detected by the visual angle scale. An additional advantage of great importance also is the fact that small changes in illumination can be made much more easily than small changes in visual angle.

In the second, it is recognized that if a small amount of blurring in the image formed on the retina is to be detected, the retina must not be given too much power to discriminate detail. High intensities of illumination give the retina much greater power to discriminate detail in the image formed than low illuminations, therefore, greater power to compensate for the error in refraction which it is the purpose of the test to disclose. This increase in power to

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[1] Visual acuity at low illumination and the use of the illumination scale for the detection of small errors in refraction. Amer. Jour. Ophth., 1920, v. 3, pp. 408-217; Sensitivity of illumination scale for determining exact amount and placement of correction for astigmatism. Amer. Jour. Ophth., 1921, v. 4, pp. 22-27.

[2] The effect of increase of intensity of illumination on acuity and the question of the intensity of illumination of test charts. Amer. Jour. Ophth., 1923, v. 6, pp. 672-675.

discriminate detail is due to the fact that sensation difference between object and background is a very important factor in the power of the eye to see its object. Under certain conditions its importance is greater and under other conditions less than size or visual angle. With a given difference in coefficient of reflection between object and background, the sensation difference increases rapidly with increase of intensity of illumination. Also an increase in the intensity of illumination decreases the size of the pupil, which serves to clear up the image formed. Obviously, then, high or even medium intensities of illumination render insensitive any method of detecting and correcting errors of refraction based on the testing of acuity.

The effect of intensity of illumination on the sensitivity of tests for astigmatism with charts of the radial line type, the third of the factors or principles noted above, may be discussed in connection with other factors which influence the sensitivity of these tests. The following are some of the conditions which are needed to render such tests sensitive in case the radial lines are black and white:

(1) The difference in coefficient of reflection between the lines and their background should be made as great as possible. That is, the radial lines should have as low and the background as high a coefficient of reflection as is possible. The background also should be neutral or as white as possible. The charts supplied to the profession are rendered needlessly insensitive by having lines of too great and a background of too little reflecting power. The background too is often yellow from age or other causes.

(2) The illuminating light should be of high intensity in order to give as much light as possible to be refracted or blurred across the black lines in the image on the retina in the meridians affected by the astigmatism. Obviously the higher is the reflecting power of the background and the greater is the intensity of the incident light, the greater will be the amount of light that is blurred across the black lines in the image and the lighter will they become. The difference in the blackness of line in the meridians affected and those not affected by the astigmatism is, it will be remembered, the crucial feature of the test.

(3) The lines should be narrow. If made broad, the light which is refracted or blurred across them in the image will have a larger surface over which to distribute and will thus be rendered proportionately less effective in causing the difference in blackness between the meridians affected and those not affected. The lines used in the charts shown in this paper are, for example, much too broad.

(4) The incident light should be white in order to give as great a sensation difference as possible between line and background in the meridians not affected by the astigmatism. If there is any color in the illuminating light, the images of the lines not affected by the astigmatism will have a smaller sensation difference from the background and will thus appear less black and less different from the lines made gray by the astigmatism than if the light is white. Artificial daylight is preferable, therefore, for the illuminating light rather than the yellow unfiltered light of the tungsten filament, for example.

(5) The eye should be rendered as sensitive as possible to light discrimination if there is to be the desired maximum sensation difference between the unblurred lines and their background. It is preferable, therefore, that the test be conducted under a very low general illumination or in darkness, and that the test chart be illuminated by a spot of light. The spot should not be any broader than the circular background on which the lines are drawn or placed. For this purpose a flood-light reflector giving a suitable intensity and cross section of beam and provided with a daylight filter is recommended, or, better still, a projectoscope similar in construction to the one described in this paper.

In figure 1, A and B, are shown two

charts of the radial line type which have been used by the writers with considerable satisfaction. In both charts the radii are strips of black velvet seven millimeters wide on a background of a reflection coefficient of 85.3 per cent. The coefficient of reflection of black velvet is approximately from 0.2 to 0.5 per cent. The radii in chart A are 7 mm. wide and 12 cm. long. The diameter of the circular background is 38 cm. and of the central space 11 cm. In chart B the width of the radial strip and of the arms of the terminal V is also 7 mm. wide. The length of the radial strips is 15.7 cm. and that of the arms of the V is 7 cm. The background is surfaced by a flat white paint applied with a camel's-hair brush. This paint may be obtained from the Munsell Research Laboratory of Baltimore. The paint should be applied as frequently as is needed to keep the surface of an approximately constant reflecting power.[3]

The disc in chart B is made to rotate about a central pin. When the V is rotated through the region of blurring, the two strips or arms become of unequal blackness; the anterior arm becoming lighter as the region is entered, the posterior as it is left. By bisecting the region between the point of beginning and end of this region of inequality, the location of the astigmatic meridian can be determined with a satisfactory degree of exactness. This chart is also useful as a final check on the correctness of the amount and placement of the correction. If both of these are correct, the arms of the V should show no difference in blackness when the disc is rotated through 360 degrees.

These charts are constructed to be used at twenty feet or greater distances.

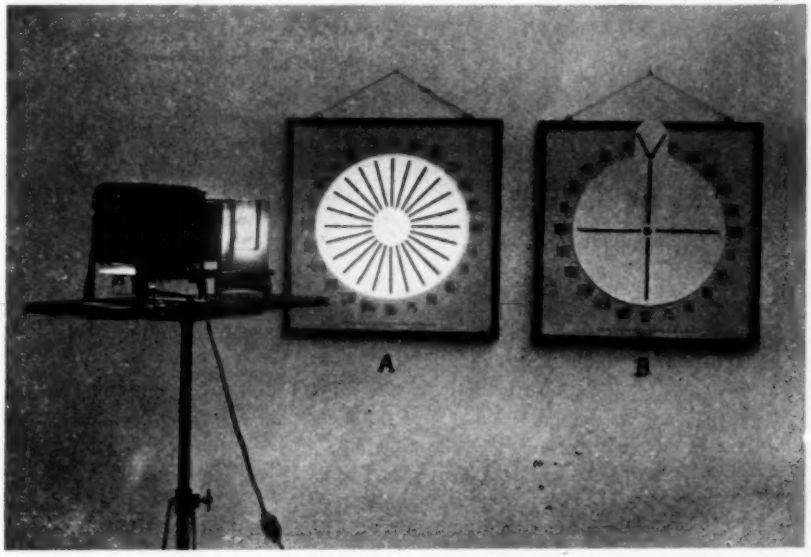

Fig. 1 (Ferree and Rand). Factors influencing sensitivity of radial line test for astigmatism.

[3] Preliminary experiments have indicated that a very good sensitivity can be given to chart A by using a transilluminated background. In carrying out this suggestion the interior of the box should be made a mat white of high coefficient of reflection. The back surface should be uniformily illuminated by tubular frosted lamps located in appropriate positions around the inside edges of the box in accord with the principles of good show case lighting. The front of the box should be painted black. Centrally located in the front of the box should be the test plate. This test plate should be of lightly ground glass. On it should be painted or otherwise surfaced the narrow radial bands or lines which constitute the test feature. This device has an advantage also in that as to illuminating system, etc. it is self-contained. The writers have not as yet found equally satisfactory any device based on luminous radial lines seen against dark or black background.

If used at lesser distances the test is rendered insensitive by the larger sizes of image formed on the retina. When viewed at short distances with the breadth of radial band used, the test is rendered extremely insensitive. However, by photographing and reducing chart A to a breadth of two centimeters for the circular disc, a chart was made with radial lines of bands sufficiently narrow to show a good sensitivity at high illumination at a distance of 20 to 40 cm. By using this chart in combination with the Hegner near point chart sold by Zeiss, a convenient testing set of vest pocket size is had. The near point chart is reduced from a large-sized chart. At a distance of 25 cm. the openings of the broken circles of this chart subtend respectively from top to bottom the following visual angles: 10, 5, 3.33, 2.5, 2, 1.67, 1.43, 1.125, 1.11, 1, 0.67, and 0.5 minutes of arc, representing at this distance acuities respectively of 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.5, and 2. Both charts may be made to fit neatly in the small holder supplied by Zeiss.

Using chart A, experiments have been conducted by us to show the effect of intensity of illumination on the sensitivity of the test. Not all of the precautions noted above were used in making these tests. For example, the illumination of the room was too high, approximately three foot-candles; the radial lines were much too broad for optimum sensitivity; the coefficient of reflection of the background was only seventy-five per cent[4]; and the test chart was spotted with Mazda light. The increased sensitivity obtained was due almost entirely to the high intensity of light on the chart.

The lantern used for the illumination of the chart was a Bausch and Lomb balopticon modified by us in the following way. A plate containing a circular aperture of suitable diameter was placed in front of the condensing lens. This aperture was covered with ground glass. Fastened on the front of the plate is a short tube two centimeters in length. Mounted at the front end of this tube is an iris diaphragm, range of aperture 5 to 65 mm. The purpose of this diaphragm is to vary as desired the size of the spot of light which is imaged on the chart or other surface to be illuminated. The light from the aperture is focused on the chart by two lenses of respectively 5 and 6.5 diopter values, separated by a distance of 15 mm. In the beam between these two lenses was placed an iris diaphragm to give the needed variation in the intensity of light. An iris diaphragm so placed will vary the intensity of light in continuous change without change in size or shape or evenness of distribution of light in the image and without alteration of color value. Thus were provided intensities on the chart which ranged from 0.45 to 75 foot-candles. In the apparatus described, therefore, the size of the spot is varied by the first diaphragm and its intensity by the second. By means of the two diaphragms either the size of the spot or its intensity may be varied in continuous change. We have found this modified projectoscope to be a very useful device in case either a variable intensity of illumination is wanted, or a variable size of illuminated area, or both. Such an apparatus has many uses in the laboratory and in the clinic.

Table 1

Showing the intensity of illumination of the radial line chart required to detect the presence of an artificial astigmatism of +0.12, +0.25 and +0.37 diopter value.

Strength of artificial astigmatism (diopters)	+0.12	+0.25	+0.37
Intensity of illumination required to detect difference in blackness of radial lines of chart (foot-candles)	25.00	2.50	0.34

[4] The coefficient of reflection of the charts shown in figure 1 is 85 per cent. These charts have been recently resurfaced with the white paint noted above. The sensivity to these charts was considerably greater after resurfacing.

Two series of experiments were conducted. In the first, artificial astigmatisms were created of respectively +0.12, +0.25 and +0.37 diopter value, and the amount of light was determined

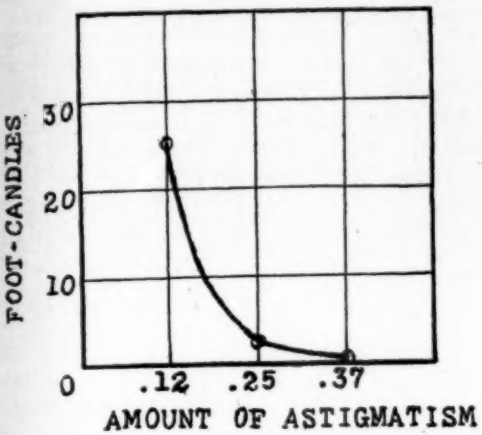

Fig. 2 (Ferree and Rand). Showing the intensity of illumination of the radial line chart required to detect the presence of astigmatism of 0.12, 0.25, and 0.37 diopter values.

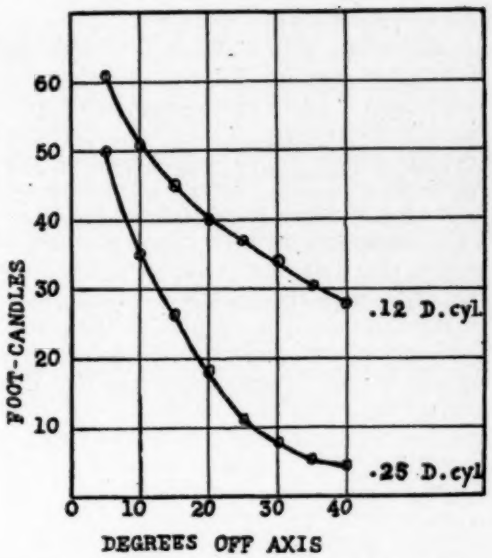

Fig. 3 (Ferree and Rand). Showing the intensity of illumination of the radial line chart required to detect given amounts of error in placement of the correction of an astigmatism.

Table 2

Showing the intensity of illumination of the radial line chart required to detect given amounts of error in the placement of the correction of an artificial astigmatism.

Strength of artificial astigmatism (diopters)	Amount corrrecting cylinder is placed off axis (degrees)	Intensity of illumination required to detect error in placement of the correction (foot-candles)
0.12	5	61.0
	10	51.0
	15	45.0
	20	40.0
	25	37.0
	30	34.0
	35	30.5
	40	28.0
0.25	5	50.0
	10	35.0
	15	26.5
	20	18.1
	25	11.1
	30	7.8
	35	5.3
	40	4.7

which was necessary for the observer just to detect the presence of the astigmatism by the difference in the blackness of the radial lines in the region affected by the astigmatism. The results of these experiments are given in table 1 and figure 2. In figure 2 the value of the artificial astigmatism in diopters is plotted against the intensity of illumination in foot-candles needed just to detect its presence.

The second series of experiments was made with +0.12 and +0.25 diopter cylinders. The correcting cylinder was

placed successively 5, 10, 15, 20, 25, 30, 35, and 40 degrees off axis. With these settings of the correcting cylinder the conducted for the purpose of determining the sensitivity of the tests for detecting errors in the placement of the correction. The astigmatisms were amounts of light were determined that were necessary just to detect the error in the placement of the correction by the difference in blackness of the lines in the chart. The results of these experiments are given in table 2 and figure 3. In figure 3 the degrees the correcting cylinder was placed off axis are plotted against the intensity of illumination in foot-candles needed just to detect the error in the placement of the correction.

From the numerous examples that might be cited of the sensitivity of the method when a high intensity of illumination is used, the following may be given. With fifty foot-candles on the chart, a noticeable difference in blackness of line is shown for the right eye of one of the writers (Ferree). When corrected with a 0.12 cylinder the location of the blackest lines is shifted ninety degrees. This indicates an ability to detect a natural astigmatism of less than 0.12 diopter. A number of similar cases have been found since we have been using the charts in this way. In fact it has been somewhat exceptional to find an eye that does not show some slight uncorrected astigmatic defect when the test is sensitized as described.

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THE RÔLE OF UNLEVEL ORBITS IN HETEROPHORIA

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Fifty patients were studied over a period of four years each of whom had one orbit more than five millimeters above the horizontal plane of its fellow. Fifty percent of these patients showed hyperphoria after giving the eyes sufficient time to settle into a steady relationship. Eighty-five percent reported striking relief of symptoms after occlusion of one eye for five days; and after this prolonged occlusion ninety-six percent showed hyperphoria of the higher eye. All of these ninety-six percent were made very much more comfortable by a correction for hyperphoria, although later increase in prism strength was necessary in six percent of the patients.

The clinical manifestations of headaches, ocular fatigue after very moderate reading, and "panoramic" headaches such as those produced by looking out of the window of a train, watching the players in a ball game, dizziness, feeling of "muscle pulling", and even distressing irritability are familiar accompaniments of muscle deviation. These symptoms usually do not disappear on correction of the refractive error of each eye independently if there is insufficient reserve to unite the visual axes at the point of fixation during the patient's waking hours. Clinically, therefore, any degree of discomfort may be manifested, depending on the power of uniting the axes and the resistance to be overcome. I shall only consider the possible resistance offered by unlevel orbits produced by facial asymmetry.

The facts that the eyes of all higher animals, thought to have single binocular vision, are on an approximate horizontal plane, and that the ocular musculature is so conceived as to operate them in this relation, suggest a possibility that fusion peripherally and perhaps centrally is the better accomplished the more nearly the eyes are on the same horizontal plane. I am fully aware of the fact that this is entirely a conjecture and that the various combinations of rotation possible by the ocular muscles make adjustment possible through wide limits without the production of clinical manifestations.

Morton (American Journal of Ophthalmology, 1929, July, page 576) cites a case of marked facial asymmetry without any clinical manifestations of heterophoria. He gives four pictures showing the lines of regard in various directions, but he has taken distance regard into account and not convergence for close fixation. It is at the nearer points that the greatest amount of torsion is necessary to overcome marked tilting of the horizontal plane. If the left orbit is the higher and the right the dominant eye, the left eye must be rotated down and in with greater consequent torsion than when the gaze is distant.

I believe this cyclophoria, and not the attempt to level the eye with the other, is the added strain which gives most of these individuals their unpleasant symptoms for near work. Likewise the constant need for quick adjustment in gazing at objects from a moving train calls for an excess of energy that is greater than that required by those eyes in which no cyclophoria needs to be corrected.

The vast majority of these individuals have no difficulties because they have sufficient muscle reserve to overcome the defect. A great deal depends on a patient's temperament, his type of work and sensitivity. In laborers or in those doing gross work great asymmetry has been met with which causes no discomfort whatever. Those found to have the unpleasant symptoms are the ones doing prolonged close work and are usually of a higher intellectual order.

It is true that, as Morton says, many reveal the lower eye to be hyperphoric when tested with a Maddox rod, but these almost invariably become hypophoric after five days of continuous oc-

clusion of one eye, showing perhaps the true state of rest in which the eyes would operate more comfortably. Furthermore, these cases seem to present the severest symptoms, which may be interpreted to mean that there is a compensatory overaction with earlier fatigue than in those patients whose eyes are underacting.

I have purposely avoided discussing the geometrical phase of this condition, because I do not believe that it depends at all on the relation of the rotation planes to the horizontal or vertical planes of the head. It is a matter of bringing the macular meridans in alignment so that the images can be fused. This is equally true of eyes on the same horizontal plane, but if there is insufficient energy or poor cooperation of the muscles for the work to be done, unlevel orbits add an extra factor to be overcome. In other words, there is insufficient energy to keep up prolonged fusion for the manifold activities of a busy life.

Fig. 1 (Brown). Unlevel orbits in heterophoria.

The muscle balances of such individuals do not always test the same on successive tests. Various results will be obtained, depending largely on the general state of fatigue or on the amount of ocular work preceding the test. If the patient is fresh and rested, the lower eye may be the hyperphoric one because of the excess of reserve energy. If fatigue and especially if discomfort is present after prolonged close application, the test is usually orthophoric or hyperphoric for the higher eye.

To stress his views Morton states that "to carry the illustration to an extreme degree (of tilting of the horizontal plane) it is possible to conceive that this tilting of the common plane might coincide with the vertical plane....it

is possible that retinal identity and binocular single vision could be preserved throughout". This is true so long as the eyes remain in parallelism for infinite focus, but this entirely disregards the function of convergence at the reading distance with the muscle structure we possess.

The records of fifty such individuals complaining of varying degrees of discomfort such as headaches, dizziness, and car sickness that might be associated with ocular dysfunction were studied for the past four years. Each of these patients was examined by an internist who could find nothing to account for the symptoms and referred him for a routine ophthalmic examination. They were all intelligent private patients who were most willing to cooperate in order to be relieved.

No one was considered in this series who on gross examination did not obviously have unlevel orbits, that is, one orbit more than five millimeters above the horizontal plane of its fellow. The ocular movements, muscle duction tests, and ordinary Maddox rod tests were done first without glasses if the patient had none, or with the correction the patient had been wearing. The results at the first examination varied from orthophoria to hyperphoria of one or the other eye as stated above. Hyperphoria of the higher eye was manifested in fifty percent after they were allowed to wait at least two minutes until wavering ceased. The lower eye tested hypophoric in twenty percent (ten patients) at first. The rest (thirty percent) were orthophoric. These are only for vertical imbalance.

The patients were then refracted under homatropin and one eye occluded for five days, following Marlow's test. They were instructed always to keep the eye covered and never to allow the two eyes to associate. By eighty-five percent of the patients relief of symptoms was reported to have been striking after twenty-four to forty-eight hours of occlusion. The others either had no relief or were annoyed by the occluding bandage. On the fifth day the occlusion was terminated in the office and the muscle balance immediately tested. Ninety-six percent (forty-eight) showed hyperphoria of the higher eye.

A full correction for hyperphoria, especially if greater than two degrees, was never given at first. Each patient always reported the day after allowing both eyes to function together, and was again checked. A postcycloplegic test followed by a muscle test was considered the criterion for the correction. The ninety-six percent still showed hyperphoria of the higher eye on the test and were corrected for approximately three-fourths of the error shown.

The muscle balance test at the first examination, the one when the occlusion tests were terminated, the one taken on the following day, and those observed thereafter are of particular interest. The horizontal lines formed by a Maddox rod placed over each eye, while constituting a relatively crude test to be sure, gave some indication as to what had taken place after the patient had become comfortable with the muscle correction. At the first examination the fifty percent testing hyperphoria with the higher eye saw practically parallel horizontal lines at twenty feet. With a Thorington light at fourteen inches the lower eye saw the line still horizontal and the higher eye saw it tilted with the nasal half higher.

This was interpreted to mean that there had been rotation on the anteroposterior axis of the higher eye in converging to the near point. It was most marked after the occlusion test in all the cases, except the two which were orthophoric throughout. The striking thing, however, was the fact that a vertical prism placed to correct the deviation straightened the tilted line to coincide with the other either fully or in part. Aligning the macular images in the horizontal plane appeared to obviate the need for undue torsion. Sixty percent (thirty) tilted their heads toward the side of the higher eye, and this became less after correction.

The ninety-six percent of individuals (forty-eight) were made infinitely more comfortable by their correction. Six

percent remained so for only two months and had to have increased prism strength as they relaxed to the correction. One patient had such an unstable balance that she was never comfortable for more than a month, but the relief afforded made her willing to change that often. Ninety percent (forty-five) remained comfortable from one to three years without change.

There are, of course, wide limits within which the great majority are comfortable. The reserve built by most healthy individuals after years of close work is comparable to that produced by any bodily exercise. However, if this reserve is insufficient during a period of illness or overwork, unlevel orbits add a factor to be overcome.

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TUBERCULOUS DACRYOADENITIS

M. PAUL MOTTO, M.D., AND ERNEST H. ROWEN, M.D.
CLEVELAND

The patient, a child of eight years, had a tuberculous infection of the spine, a tuberculous elbow, and a swelling in the upper eyelid which was aspirated four or five times. The outer half of the upper lid became contracted from cicatricial change. Rapid local improvement followed excision of the tumor mass, and blepharoplasty relieved the lid deformity, but the patient developed a generalized tuberculosis. From the ophthalmic divisions of Lakeside and Rainbow Convalescent hospitals.

Tuberculous dacryoadenitis, according to de Schweinitz[1], has been reported only twelve times. A thorough review of the German and French literature brings out the interesting fact that only five cases have been reported since 1894. Contributors who have written on this subject are: Achard and Le Blanc[2], Beauvieux and Pesme[3], Plitt[4], Salzer[5], and van Duyse[6].

We feel, therefore, that our case merits presentation, first because of its extreme rarity, and second because of complications which we encountered in our patient.

It would seem quite proper, before going into a detailed report of the case, to outline a few of the characteristic features of tuberculous dacryoadenitis. Ball[7] gives the following clinical points to be considered in arriving at an accurate diagnosis: "1. The presence of a hard tumor, about the size of an almond, situated at the upper and outer part of the orbit; 2. The rapid growth of the tumor; 3. The swollen and hyperemic condition of the skin over the site of the tumor; 4. Practically all patients show tuberculosis elsewhere; 5. Motility of the eye is not limited."

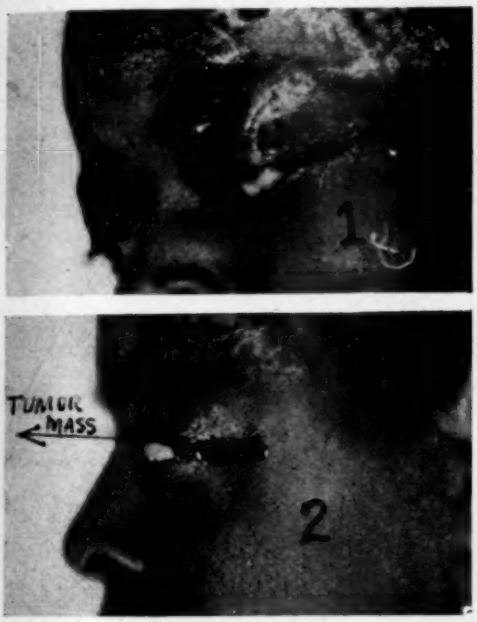
Our case, with few minor exceptions, followed the typical clinical picture as given by Ball. The case was seen by one of us (Motto) in the Rainbow Convalescent hospital, and was later admitted to the ophthalmic service of Dr. A. B. Bruner at Lakeside hospital.

The patient, T.W., male, colored, aged eight years, was admitted October 29, 1928, with complaint of poor vision in the left eye, of approximately one year's duration; and of inability to close the left eye, due to changes in the outer half of the upper eyelid.

History: The child was in perfect health until two years ago. At this time he developed measles, complicated later with whooping cough. He was confined to the house eight weeks, then returned to school. A few weeks later he was referred to a children's clinic by the school doctor on account of persistent cough. During this examination, a tuberculous infection of the spine was discovered. He was placed on a Bradford frame and sent to the fresh air camp. While at the camp, he developed two fluctuant swellings, one on the right elbow, and the other in the outer half of the left upper eyelid. According to the patient, the swelling on the elbow ruptured spontaneously and, after draining for several months, healed up leaving no impairment of

joint functions. The swelling in the eyelid did not rupture, but was aspirated four or five times, a considerable amount of yellow fluid being obtained at each aspiration.

In November, 1928, the patient was transferred to Rainbow hospital, and Dr. Motto was called in consultation. His description of the case at that time was as follows: There is ectropion of the upper left eyelid especially in the outer half, due apparently to connec-



Figs. 1 and 2 (Motto and Rowen). 1, appearance on January 25, 1929, after operation performed on January 8, 1929. 2, showing tumor mass, April 13, 1929.

tive tissue changes in this section of the lid. What appears to be redundant conjunctiva projects about one cm. below the outer third of the lid margin. The patient is unable to close the outer half of the eye, because of these changes, and examination with the lid everted is not possible. The cornea shows several opacities due, possibly, to an ulcerative keratitis. Vision O.S. 2/60. The left upper lid shows slight ptosis. At this time, a tentative diagnosis was made of an inflammatory tumor mass, probably tuberculous in origin. The patient was admitted to Lakeside hospital December 12, 1928.

General examination: Well developed colored boy lying quietly in bed on a Bradford frame. Physical examination shows marked kyphosis about the region of the twelfth dorsal vertebra. There is a healed scar on the right elbow. The eye condition is as described by Dr. Motto. The remainder of the examination is essentially negative.

Operative notes: December 14, 1928, under general anesthesia, an attempt was made to correct the deformity in the upper eyelid. A great deal of scar tissue was found in the outer half of the lid in the connective tissue layers. As much as possible of this scar tissue was removed, and the overlying skin was dissected free from adhesions. Retaining sutures were placed in the lid to draw up the under part. The operation was unsuccessful.

January 8, 1929, under general anesthesia, a second operation was done. A Fricke flap was taken from the left frontotemporal region and placed in the outer half of the upper lid to reconstruct it. (See figure 1.) This operation gave a fair result.

April 13, 1929, the patient was readmitted from Rainbow hospital with the complaint of still being unable to close the left eye. This difficulty was not so marked as previously. (Figure 2.)

Examination of the left eye at this time showed as follows: There is still some ptosis of the upper lid. A red tumor mass projects about one centimeter down from the outer half of the upper lid, covered below by conjunctiva, and above by skin. The mass is movable, not being adherent to deeper structures. It is only slightly indurated and feels like a mass of granulation tissue. The lid is apparently prevented from closing by this tumor mass.

April 15, 1929, under general anesthesia, as much as possible of this mass was excised with that portion of the conjunctiva immediately in contact with it. The remaining conjunctiva was drawn together with silk sutures, and an external canthotomy was done

to increase the palpebral fissure. The tumor mass was sent to the pathological laboratory for diagnosis.

The laboratory findings at Lakeside hospital were as follows: Urine negative. White blood count, 7,800. Wassermann negative. Tuberculin tests positive.

The following is the pathological report as submitted by Dr. Allen Moritz, associate professor of pathology in the school of medicine of Western Reserve university.

Clinical diagnosis, inflammatory tumor? The specimen measured 2.5 by 1.2 by 1 cm.

Histological examination: Sections through a mucous membrane covered by transitional epithelium beneath which there is a structure histologically characteristic of lacrimal gland. The epithelium is denuded over a small area and the surface at this point is made up of exuberant granulation tissue. The glands show diffuse lymphocytic infiltration with parenchymatous degeneration of glandular epithelium. Glandular acini are often separated widely from one another by collections of lymphocytes in the stroma. There are a number of small granulomatous lesions, some of which are focal collections of large endothelial cells with a peripheral zone of lymphocytes, while others show central caseation necrosis with surrounding endothelial cells and lymphocytes. Occasionally the center of such a lesion is occupied by a Langhans type giant cell. Multinucleated giant cells are quite numerous.

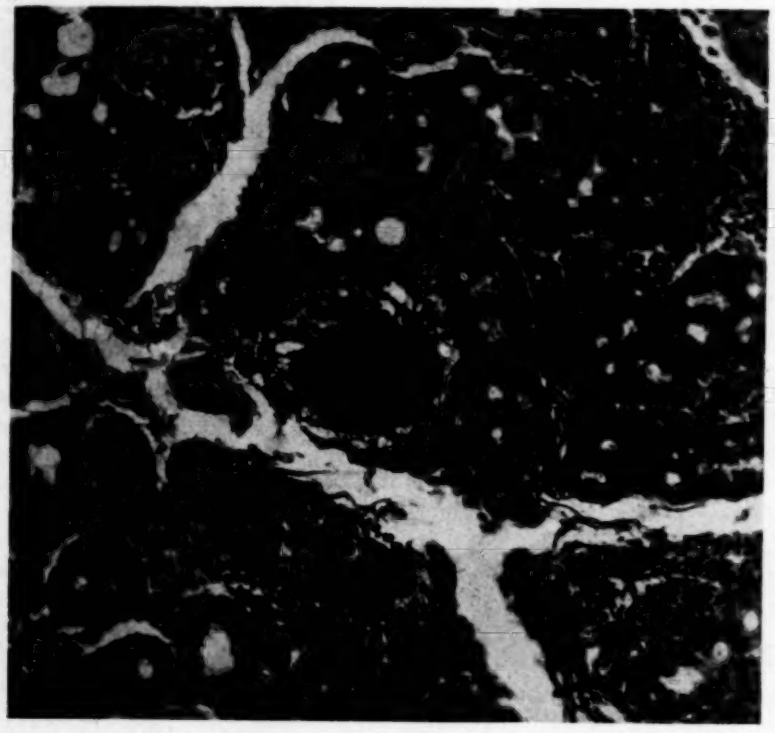


Fig. 3 (Motto and Rowen). Microscopic section, showing large giant cells, structure of lacrimal gland, and diffuse round cell infiltration.

Diagnosis: tuberculous dacryoadenitis.

June 29, 1929, the patient was last seen by us at Rainbow hospital. He was able to shut the left eye, although there was still a slight induration of the tissues around the site of operation. The general condition of the patient

was much worse, and he had several abscesses on various parts of the body, the main ones being bilateral psoas abscesses pointing in the groins. The clinical picture of the case had become typical of a generalized tuberculous infection.

Comment

The outstanding features of our case were as follows:

(1) Absence of a definite tumor mass over the site of the lacrimal gland.

(2) Extension of the lesion beyond the upper lid margin, and its apparent slow growth.

(3) Marked contraction of the outer half of the upper lid due to cicatricial changes resulting from a previous ulcerative process, no doubt tuberculous, causing conspicuous deformity, and preventing normal closure of the lid.

(4) The presence of diffuse opacities of the cornea causing marked diminution in vision.

(5) The presence of a tuberculous process in the patient elsewhere.

(6) Rapid local improvement after excision of the tumor mass.

(7) Practical restoration to normal function of the upper eyelid due to plastic operation.

We wish to acknowledge our deep appreciation and thanks to Dr. A. B. Bruner for his kindly cooperation and assistance. We are also indebted to him for the privilege of reporting this case.

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References

[1] De Schweinitz, G. E. Diseases of the eye, tenth edition, p. 648.
[2] Achard, C., and Le Blanc, A. Un cas de dacryoadénite tuberculeuse avec tuberculose cutanée de la paupière supérieure. Bull. et mém Soc. méd. des Hôp., 1918, v. 42, p. 838.
[3] Beauvieux and Pesme. La dacryoadénite tuberculeuse; tuberculose attenuée de la glande lacrymale. Arch. d'Ophth., 1922, v. 39, p. 22.
[4] Plitt, W. Über Tuberkulose der Tränendrüsen. Klin. M. f. Augenh., 1905, v. 43, supplement, p. 40.
[5] Salzer, F. Ein Beitrag zur Kenntnis der Tuberculose der Tränendrüse. Arch. f. Ophth., 1894, v. 40, pt. 5, p. 197.
[6] Van Duyse, D. Tuberculose attenuée des glandes lacrymales; guérison spontanée. Arch. d'Opht., 1896, v. 16, p. 554.
[7] Ball. Modern ophthalmology, v. 1, p. 322.

MONOCULAR BLINDNESS FROM LIGHT OF ELECTRICAL ORIGIN

Case report

J. N. Roy, M.D., F.A.C.S.

MONTREAL

The patient watched electrical welding for about eight minutes at a distance of four or five feet, without protective glasses. A double ophthalmia, complicated by cloudy vision of the right eye, left as terminal conditions several retinal lesions and an atrophic nerve head; and the vision of this eye was almost entirely lost. The literature of the subject is reviewed, and the pathology discussed. Read before the tenth "Congrès des médecins de langue française de l'Amérique du Nord", Quebec, September, 1928.

To my knowledge medical literature relates the observation of seven cases where the two eyes have been lost by the dazzling effect of electric light, after having been exposed to the intense luminous rays of lightning, of the sun, or of a short circuit. As the patient who is the subject of this work has become blind in one eye only, after being exposed, at a short distance, to the rays from electricity and from molten metal, I believe it interesting to publish his history, and I shall take this opportunity to review the most recent theories on the injurious action of strong light in relation to the visual organ.

Case report: On May 25, 1927, Mr. A.B., thirty-seven years of age, laborer in a foundry, received the order to carry a bar of steel into an electric welding room. Entering these premises for the first time, he was keenly impressed, especially by his companions' description of the workings of the machinery. He also, at a distance of four to five feet from the luminous source, looked persistently during a period of about eight minutes, without any protective glasses, at the rays emitted by a mass of metal in a state of incandescence under the action of a strong electrical current.

During the hours which followed, a double ophthalmia declared itself, and a few days later he noticed a clouding and weakness in the vision of the right eye. The objective palpebral and conjunctival symptoms of the two eyes disappeared rapidly, as they always do, under the ordinary therapeutic treatment, but the visual power of the right eye gradually diminished. At the time of my examination, on January 15, 1928, I observed a cicatricial lesion of the retina, near the temporal side of the optic disc, a lesion of the macula lutea, a narrowing of the retinal arteries, and finally a general discoloration of the papilla, accompanied by a definitive optic atrophy of this eye, which had reduced the vision to light perception. The patient being then seen for the first time, it is impossible for me to describe the neuroretinal alterations which had been successively produced since the time of the accident. However, from the oculists who had observed him during the few months after the dazzling, I learned that on June 12, that is to say eighteen days after his exposure to the luminous rays, the vision of the right eye was one-tenth; that on July 27 and October 7 the vision had again been recorded as one-tenth; and that since that date the visual acuity had gradually diminished till it disappeared almost entirely.

As to the left eye, I found the condition normal from all points of view.

Let us consider briefly how light acts upon the eye.

Whether light be constituted according to the quantum theory, or by undulatory radiations, or by the two at the same time, in any case, it is necessary for it to be absorbed before producing photochemical, photocaloric, photoelectrical, and photosensorial modifications in the retina. These varied transformations of energy depend upon deep electronic modifications, which beyond certain limits are destructive and per-

manent. Thus the radiations of a very intense visible light may produce serious and irreparable lesions of the retina by electronic modifications which give rise to very little heat.

What I have said in relation to the light of day, applies to electrical or other lights. It is comprehensible that a powerful light may cause, on this delicate membrane, permanent lesions which may sometimes terminate in complete atrophy of the optic nerve.

We know that electrical ophthalmia can produce, upon the teguments of the face and of the eyelids, and upon the anterior segment of the eye, especially by the effect of invisible ultraviolet chemical rays, and of invisible infrared caloric rays, a series of changes including dermatitis, palpebral edema, conjunctivitis, keratitis, and iritis. Opinions are rather divided as to cataract of actinic origin. Some argue that the ultraviolet rays, in rendering the crystalline lens fluorescent, are transformed into visible rays of greater wave length. Such a transformation of energy, by modifying the lens substance, may cause cataract. Other observers incriminate the invisible infrared radiations in the development of cataract. A certain number of authors believe that neither the ultraviolet nor the infrared rays can produce cataract. Cataract is much more frequent in tropical latitudes than in countries where the sun is less powerful, although this fact may be attributable to the great heat of these regions or to facts of diet.

After electrical dazzling, the retina is the membrane first affected. The macula lutea is particularly susceptible to powerful luminous rays, and its alteration produces a central scotoma, transient or permanent. The retina loses its transparency, and presents a more or less edematous aspect around the optic nerve and the large blood vessels. The papilla may remain normal, or in certain circumstances it becomes inflamed, or hazy in outline. The central visual acuity is diminished and sometimes the visual field is narrowed. In the majority of cases all these phenomena disappear after a certain time, and the dazzling does not leave any permanent effect. In others, on the contrary, the papillomacular bundle becomes atrophied, and this lesion produces a permanent central scotoma. Finally, when the light received has been most intense, it may cause cicatricial islets in the retina, a diminution in caliber of its blood vessels, and lastly discoloration and atrophy of the optic nerve, ending in blindness. These facts are not sufficiently dealt with in the textbooks on ophthalmology.

I should like to recall from the medical literature a few cases in which amaurosis has been recorded.

Brière gives the history of a young girl of eleven years who, after walking through a violent electric storm, presented ophthalmoscopical symptoms of bilateral neuroretinitis, and finished by losing her eyesight.

Rohmer relates the observation of a boy of twelve and a half years who was struck by lightning which hit a tree at a distance of a few paces from him. The final result of the shock and the dazzling was a double papillary atrophy.

Knies also mentions a case of optic atrophy in a child of ten years, following electric ophthalmia.

Finally, Terrien, among about fifty subjects observed during construction of the Metropolitan underground railway of Paris, saw three cases of atrophy of the optic nerve following electric dazzling.

In my patient, it is interesting to note that the deep layers of the left eye had not been damaged at the time of the accident, and that the vision of this eye was normal. However, it is natural to suppose that when he was looking at the very strong light, a reflex movement caused his head to turn toward the left side, and thus the retina of this side was less extensively exposed to the effects of the harmful visible rays, while the disc was protected by the nose.

In the present case must we assume that the lesions of the retina, and consecutively the atrophy of the right optic nerve, had been produced by the

electric source itself, or by the visible light from the molten metal, or by both of these kinds of radiation? It is rational to consider that all the incandescent particles had contributed to the ultimate effect; alike those that had been detached by the electric arc, and those which had remained adherent to the solid mass; but each according to its temperature and its characteristic radiations.

As I have just suggested, it is probable also that the rays fell rather obliquely upon the face, and that the area affected had not been very extensive, the left eye being protected by the nose in slight deviation of the head.

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Bibliography

1876. Brière. Neuroretinitis caused by lightning; blindness resulting. Gaz. des Hôp., no. 41.
Netter. Remarks on a case of blindness caused by lightning. Rev. Méd. de l'Est., p. 339.
1882. Haab. Ocular lesions due to sunlight. Correspondenzbl. f. Schweize Aertze, p. 383.
1884. Gayet. The absorbing power of the lens for ultraviolet rays. Bull. Soc. Franç. d'Opht.
Little, D. The effects of strong light upon the eye. Ophthalmic Rev., July.
1886. Vossius. Ocular affections caused by lightning. Centralbl. f. prakt. Augenh., June.
1887. Martin. Pathogenesis of electric ophthalmias. Ann. d'Ocul., July-Aug.
1888. Terrien. Electric ophthalmia. Arch. d'Opht., p. 1.
Caudron. Electric sunstroke. Rev. gén. d'Opht., Feb.
1891. Bresse, A. Electric ophthalmia and electric sunstroke. Thèse de Nancy.
Nodier. Ophthalmia caused by electric light. Thèse de Nancy.
1892. Vossius. A case of lightning affection of the eye. Beiträge zur Augenh., p. 42.
1894. Brose. Two cases of electrical flashing followed by severe retinal irritation and intense pain. Arch. of Ophth., p. 124.
1895. Cassien. Results on the visual apparatus from electricity on board warships. Thèse de Bordeaux.
Rohmer. Disturbances caused by fulguration of the ocular apparatus. Arch. d'Opht., p. 211.
1897. Roy, Dunbar. The effect of intense flashes of electric light upon the eye. Amer. Jour. Ophth., Dec.
1902. Panas. Amblyopia and amaurosis from electric discharge. Arch. d'Opht., p. 625.
Terrien, F. The prognosis of visual disturbances of electric origin. Arch. d'Opht., p. 692.
1903. Mettey, E. Clinical and experimental researches on electric dazzling. Thèse de Paris.
1904. Gonin. Ocular lesions caused by lightning. Ann. d'Ocul., Feb.
Birch-Hirschfeld. The action of ultraviolet rays on the eye. Graefe's Arch., p. 469.
Rosenthal. Ocular disturbances, especially functional, caused by lightning. Thèse de Nancy.
1905. Rohmer. Ocular accidents from electricity. Encycl. Franç. d'Opht., v. 4, p. 825.
1906. Ginestous. Electric ophthalmia. Gaz. hebd. des Sciences Méd. de Bordeaux, Dec.
1908. Birch-Hirschfeld. New contribution to the study of ocular disturbances caused by ultraviolet light. Zeit. f. Augenh., July.
1909. Coullaud. Eight cases of electric ophthalmia. Arch. d'Opht., Jan.
Van Lint. Ocular accidents produced by electricity. Soc. Belge d'Opht., Nov. 28.
Hallauer. Absorptive power of the lens. Klin. M. f. Augenh., p. 721.
1910. Best. Ocular changes from luminous and ultraviolet rays. Klin. M. f. Augenh., March.
MacMullen. Injurious effects of strong light on the eye. Ophthalmic Rev., April.
Parsons, J. H. Effects of strong light on the eye. Jour. Amer. Med. Assoc., p. 2027.
1911. Berthelot, D. Chemical effects of ultraviolet rays. Rev. gén. des Sciences, p. 322.
1912. Terrien, F. Visual disturbances caused by electricity. La Presse Méd., March 6.
Vogt, A. Experimental researches on the power of infrared rays to penetrate through the transparent media of the eye. Graefe's Arch., p. 155.
1913. Parsons, J. H. Ocular affections produced by exposure to excessive light. Internat. Med. Congress, London, Sec. on Ophth., Aug. 6-12.
1916. Moreau, F. Electric ophthalmia. Ann. d'Ocul., p. 351.
1928. Roy, J. N. Electric dazzling. Some medicolegal considerations. Ann. d'Ocul., June.

NOTES, CASES, INSTRUMENTS

RETINAL DETACHMENT FOLLOWING ADMINISTRATION OF INSULIN

G. M. McBEAN, M.D., F.A.C.S.
CHICAGO

Miss Louise S., aged thirty-five years, housekeeper, has been my patient since 1912. She has worn compound hyperopic lenses of three diopters, which formerly gave her vision of 20/30 in each eye.

She has been greatly overworked taking care of her invalid mother, who died last year with cranial hyperostosis. Miss S. has always been much undernourished, her weight at present being about seventy-one pounds, her height five feet two inches.

In order to increase her nutrition her family physician has been giving her ten units of insulin daily for about two months, although she is said to have had no hyperglycemia nor glycosuria.

Shortly after starting the insulin injections vision in the left eye became much blurred, and when she consulted me on June third the eye was almost blind, with the retina detached and a secondary painless iridocyclitis with almost complete seclusion of the pupil.

I advised her to discontinue the use of insulin as I believe this is to have been the direct cause of the retinal detachment.

58 East Washington street.

TWO UNUSUAL CASES OF CATARACT

M. M. CULLOM, M.D., F.A.C.S.
NASHVILLE

Case 1: Mr. A. D. G., aged sixty years, consulted me on November 3, 1925. He gave a history of poor vision from birth. He had learned to read by holding the print quite close to his right eye. R.V. 4/200, L.V. 2/200. Examination showed posterior polar cataracts in each eye, but much larger than usual, and the left larger than the right. The lenses except for these opacities were perfectly transparent. He had consulted other men who had advised leaving them alone. This I felt was pretty sound advice, but on account of his deficient vision the man was more or less dependent and helpless and was anxious to have something done, so I took his case under consideration. I could find no encouragement in the literature for operative interference in posterior polar cataract. In fact, the only author who mentioned that feature dismissed it with the succinct statement, "Treatment none." However, I could see no reason why an effort should not be made to improve the patient's condition, and decided to undertake the extraction of the left lens in its capsule.

He had a mouth full of carious teeth and a pair of badly diseased tonsils. I advised removal of the tonsils and extraction of the teeth preliminary to operation. I removed the tonsils on November 7, 1925, and his dentist completed the extraction of his teeth in about a month. He did not return for the eye operation until May 5, 1926.

I undertook to extract the lens in its capsule, but the capsule ruptured and I delivered a very large nucleus without loss of vitreous. Apparently the lens came away entirely, as no lens matter showed up after the operation.

The lens was perfectly transparent except for the opacity at the posterior pole, which was circular in shape and four mm. in diameter. There was a central dot of opacity, while the remainder of the opacity grew gradually less dense until it reached its edge, which was sharply limited from the remainder of the perfectly transparent lens. Recovery was without incident and was followed by development of a secondary membrane. On July 7,

1926, I successfully divided the membrane with a Graefe knife, and on July 18 the eye had 20/40 vision with +12.00 sphere, and with +16.00 sphere read Jaeger no. 1 with ease. On December 8, 1926, vision was 20/20 with +10.00 sphere +2.00 cylinder axis 145°.

Case 2: June 22, 1926, I was consulted by Mr. H. D., white, aged forty-nine years. For two months his left eye had been giving pain, at times quite severe. He had been struck in the left eye when nine years old by a limb falling from a tree, and since that time he had had no use of this eye. Examination showed that he had a divergent squint, and that this left eye had marked ciliary injection and a widely dilated pupil. A dislocated lens was floating free in the vitreous, changing its position with the position of the eye. At one time it would be in the anterior chamber in contact with Descemet's membrane, and at another it would be showing only a part of its outline above the lower margin of the iris.

The patient was pretty well worn out with pain and inability to work, and came expecting to have the eyeball removed, as he considered it a useless eye. Feeling that the trouble was caused by the dislocated lens acting as a foreign body, I wished to watch the case for a few days. But treatment with hot applications had no effect on the pain, so I decided to make an effort to extract the lens.

The operation was performed on June 29, 1926. On account of the inflamed condition of the eye, it was thought best to attempt extraction under a general anesthetic. I told the patient that if the effort to extract the lens was unsuccessful I would remove the eyeball. A linear incision was made as for a simple extraction and a large swollen lens was delivered without difficulty, together with quite a large amount of soft lens matter. There was no further pain and healing was uneventful, though the ciliary injection was slow in subsiding. At the date of writing, March 5, 1929, the eye is white, painless, and quiet. The pressure of the lens against Descemet's membrane seems to have caused an opacity of that membrane which interferes with vision. The patient counts fingers readily on looking to the side, and I still hope that in time further clearing may result from the removal of the source of irritation, namely the dislocated lens.

Here is a case of dislocated lens remaining quiet in the vitreous for forty years, then setting up pain and inflammation; these symptoms being relieved by successful extraction.

1119 Bennie-Dillon building

A HERNIA OF THE VITREOUS TWO DAYS AFTER CATARACT EXTRACTION

SARADINDU SANYAL, M.B.
CALCUTTA, INDIA

A Hindu male aged fifty years was operated on for senile cataract of the left eye. The stages of the operation were: sclerocorneal incision with a moderate conjunctival flap, no iridectomy, capsulotomy, and lens extraction. No complication occurred during the operation. On the third day after operation, i.e., after forty-eight hours, on removing the bandage, a cystic tumor was seen lying on the upper part of the globe between the conjunctiva and the sclera and in communication with the anterior chamber. The tumor was about one-third inch in diameter. It was not very tense, and the fluid inside could be displaced from side to side. The anterior chamber was obliterated, and its upper part was filled with white substance, while in the lower part the iris could be seen. There was no history of coughing, sneezing, or getting up from the bed. On excising the tumor, some fluid and some gelatinous substance were removed. Microscopic examination of the gelatinous substance showed it to be vitreous. The sight of the patient was eventually lost.

Evidently the anterior chamber had formed a communication with the subconjunctival space, and aqueous had

found its way there, followed by vitreous which was perhaps abnormally fluid.

Although slight hernias of the vitreous humor are said to be common after cataract extraction, as evidenced by slit-lamp examination, gross hernia seems to be uncommon.

I am indebted to Dr. J. N. Moitra for kindly showing me the case. During his twenty-five years' large practice both in the hospitals and outside he has never seen such a case.

17-2 Beadon street.

SPASMODIC OCCLUSION OF CENTRAL RETINAL ARTERY, EARLY RESTORATION OF BLOOD FLOW, BUT NO USEFUL VISION

GEORGE L. KING, JR., M.D.
ALLIANCE, OHIO

Occlusion of the central artery of the retina, while not rare enough to be classed among the medical curiosities, is relatively infrequent. A survey of the standard texts and reference works brings out the fact that, while certain methods of treatment may be beneficial if applied soon enough, there is no good evidence as to how soon is soon enough. Most authors make no attempt to state the length of time which must elapse before treatment is useless. Collins and Mayou state that the artery usually refills with blood within from a few hours to twenty-four hours but that this refilling is always too late to save the retina. Others have set the upper limit of useful effort at forty-eight hours.

Case reports are generally devoid of information as to the time elapsed between loss of vision and return of circulation to the retina. A case in which the time element was accurately observed would therefore seem to be of sufficient interest to report.

Case: Mr. R. M. J., aged 54 years, an intelligent and alert salesman, was first seen one evening about five p.m. He reported that he had been making calls in his territory about ten miles from town when he suddenly became completely blind in the left eye. He at once sent for help because he feared to drive his car alone, and he came directly to the office. He had observed that the accident had occurred at approximately four p.m.

Upon inquiry he stated that he had had attacks of transient dimness of vision affecting a part of the field of this eye for a number of years, the exact period being unknown. The vision had seemed normal between attacks, and his general health had been good.

On examination, the left eye was externally normal, media clear, pupil dilated and did not react to light but did react to accommodation. Ophthalmoscopic examination showed that the entire trunk of the central artery of the retina had been obliterated and showed only as a white glistening cord. The retina was anemic but no necrosis was present and the cherry red spot in the macula had not yet appeared.

Treatment was immediately instituted, consisting of massage of the eye and amyl nitrite inhalations. The latter profoundly dilated the vessels of the skin but had no apparent affect on the retinal artery. This treatment was persisted in for one hour and the patient was then sent home with instructions to continue massage. The artery was empty at this time.

About three hours later, or five hours after onset, the patient was seen at his home, and the artery was found to be entirely filled with blood. There was nowhere any segmentation or beading of the blood current.

The next day there was definite evidence of retinal necrosis, and the cherry red spot was manifest. The artery appeared full. Hand movements could be distinguished in the temporal field.

Two months later the retina appeared fairly normal in color, and fingers could be counted in the temporal field. Five months after the accident there was present a pronounced secondary optic atrophy, and the arteries were markedly reduced in caliber, while the veins remained about normal. The picture was typical of a late result of occlusion of the central artery of the retina. Vision

remained counting of fingers in the temporal field.

The facts of interest in this case are (1) that the patient was seen and treatment instituted not more than one hour after the accident occurred; (2) the circulation was observed to have been restored not more than five hours after the accident and may have been restored as early as three hours after; (3) that in spite of early and active treatment the case went on to blindness except for a small portion of the temporal field.

A diagnosis of spasmodic occlusion of the central artery was made for the following reasons:

1, the history of previous transient attacks of blindness

2, the early restoration of circulation

3, the absence of any constitutional defect upon complete general physical examination

537 East Market street.

AN OPHTHALMIC REFERENCE IN THE WILL OF A RABBI OF THE FOURTEENTH CENTURY

AARON BRAV, M.D.
PHILADELPHIA

In reading the "ethical testament" of Rabbi Judah Asheri, who died in the year 1327 of the Christian era in Toledo, Spain, I find the following interesting ophthalmic reference. (The manuscript is in the British Museum.)

"When I was an infant about three months old my eyes were affected, and they were never completely restored. A certain woman tried to cure me when I was about three years old, but she added to my blindness to the extent that I remained for a year confined to the house, being unable to see the road on which to walk. Then a Jewess, a skilled oculist, appeared on the scene. She treated me for about two months and then died. Had she lived another month I might have received my sight fully. As it was, but for the two months' attention from her I might never have been able to see at all. Blessed be the Lord who exercised marvellous loving kindness toward me and opened for me a lattice through which I might behold with my own eyes the work of his hands."

This happened while he was living in Germany, where he was born in the year 1250. It is difficult with any degree of certainty to diagnose his case. It could not have been an interstitial keratitis, as his whole family consisted of pious scholars, rabbis, and students, and he himself lived to the ripe age of seventy-eight years. The probability is that he suffered from a scrofulous keratitis.

The name of the woman physician and the method of treatment are not stated in the testament.

(Extract from "Hebrew ethical wills", by Abraham.)

2027 Spruce street.

SENILE CATARACT IMPROVED BY DIABETES?

THOMAS HALL SHASTID, M.D., F.A.C.S.
DULUTH, MINNESOTA

Some strange things pop up in cataract work. A man of fifty-six years had a decided perinuclear cataract with a few marginal spokes in each eye. I offered to try to help him therapeutically, but he refused, having been told by some other oculist that all treatment of incipient cataracts was useless. For more than three years I did not see him. Then he returned for a change of glasses, and meantime he had acquired a rather severe case of diabetes. Much to my astonishment his lenticular opacities had disappeared. There was not so much as a trace left of any of them. And instead of +2.75 D. for reading he needed only +1.75.

The swelling of the lens and consequent diminution in the manifest presbyopia were not unusual. But to find that this swelling had occurred while at the same time the opacities were disappearing was uncommon indeed, if not unique. To find this, furthermore, occurring while the patient was actually passing into diabetes—a disease which,

as is well known, not infrequently produces absolute cataract—is something extremely remarkable.

Had the man taken treatments I should have had a record of a brilliant cure, and in consequence should have been completely confused in all my calculations about cataract for a long time thereafter.

Taking the data as they stand, what had happened? Is there anything mutually antagonistic between the two forms of cataract, the ordinary senile and the diabetic? If so, is this mutual antagonism operative at all times, or only under certain circumstances?

We know so little about cataract, and the subject is so supremely important, that we ought to strive continually to learn more. We should all observe closely and report, observe closely again and again report. Then we should collate all the numerous findings. Also we should try this and try that. To attempt nothing whatever, all the time shouting "no use", is to be criminally recreant to the welfare of ophthalmology and of humankind.

629 East First street.

HOT EYELIDS AND COLD

THOMAS HALL SHASTID, M.D., F.A.C.S.

DULUTH, MINNESOTA

A dentist aged forty-eight years, bachelor, came to me for a change of glasses. His chief symptom, which he did not even expect to get rid of, was coldness of the eyelids. This sensation never occurred in the daytime but appeared in full force each night, just as soon as he went to bed. It was rather severe and distressing, and had not remitted, except by day, since its first occurrence many years before. For relief, the patient was accustomed, before retiring, to place a pledget of cotton over each closed eye and then, to keep the cotton in place, to put on a pair of goggles. So trussed up, he could sleep —otherwise not.

Another patient, a woman of thirty-six years, unmarried, was greatly troubled by a sensation of heat in all her eyelids. This, too, was so distressing that she could not sleep, except when she had placed pledgets of cotton over the closed lids and tied across them a compressive bandage. So treated, her eyelids cooled materially.

Strange that one of these cases could be relieved on the (allegedly) allopathic principle, contraria contrariis; the other on the homeopathic similia similibus curantur.

I took it that the woman's case was one of hysteria; the man's, however, an actual, although mysterious, disturbance of the temperature sense. The man was too strong, rugged, active, and in general insensitive for a diagnosis of hysteria to be made in his case.

629 East First street.

SOCIETY PROCEEDINGS

Edited by Dr. Lawrence T. Post

BALTIMORE CITY MEDICAL SOCIETY

Section on ophthalmology

January 24, 1929

Dr. Clyde A. Clapp presiding

A case of Claude Bernard-Hörner syndrome

Dr. G. S. Lachman showed a physician, thirty-eight years of age, who had been severely injured in an automobile accident in 1924, sustaining a basal skull fracture, several fractured ribs on the left side, and a compound comminuted fracture on the left elbow. Two months after the accident an amputation was done at the left wrist because of the onset of gangrene of the hand. Shortly after this, a second amputation was done just above the elbow, and soon a third two inches above the second, several weeks later, because of the extension of the gangrene. Very painful neuromata developed above the stump. These were removed on several occasions, but continued to recur. The excruciating neuralgic pain was not affected materially by opiates, and a division of the brachial plexus was attempted in the hope of cutting off all the sensory fibers. This was unsuccessful, and in a fourth amputation the entire head of the humerus was removed. New neuromata developed in the neck region after his discharge from the hospital and these became very painful. Two years after the accident an extensive laminectomy was performed in which the ventral and dorsal roots of the fifth, sixth, seventh, and eighth cervical, and of the first thoracic were divided. This gave complete relief from pain.

In the wake of the spinal operation a typical Hörner syndrome appeared, which the patient himself noticed several days after the laminectomy. On examination there was noted atrophy of the left side of the face which caused a marked difference in expression on the two sides. There was complete left-sided anhydrosis of the face—complete absence of perspiration on this side, even in the warmest weather, whereas the right side was usually flushed and moist. The left eye showed enophthalmus, ptosis, narrowing of the palpebral fissure, and miosis. Both pupils reacted normally to light and accommodation. The fundi were normal. As had been already noted by various writers, there was a small difference in the intraocular tension in the two eyes. With the Schiøtz tonometer, the tension in the right eye was 22, and in the left 18 mm. The measurement of the pupils in slightly subdued illumination was as follows: right 4 mm., left 2.5 mm. Twenty minutes after instillation of four percent cocaine into each conjunctival sac, the right pupil measured 9.5 mm. and the left 3.5 mm. The right palpebral fissure measured 10 mm., the left 8 mm. Following cocaine, the right measured 12 mm., the left 8.5 mm. It was noticed that the right pupil dilated rather remarkably within a few minutes after the cocaine instillation, which might indicate an irritative state of the sympathetic on the right side.

Dr. Lachman pointed out that the case was especially interesting in that it followed a deliberate surgical division of the sympathetic tract at its emergence from the cord, and was a clinical demonstration of Whitnall's statement that the pupillodilator fibers emerged from the cord at the level of the first thoracic nerve to enter the first thoracic ganglion, alhough it did not, of course; prove that the fibers did not leave above this level.

The causes of the classical signs in Hörner's syndrome were then briefly discussed. The speaker stated that the enophthalmus was the most difficult to explain. Various writers gave different opinions. Shreiber believed that shrinkage of the orbital fat due to trophic changes, together with loss of

vasomotor tone of the orbital vessels, might be the basis. Others mentioned paralysis of Müller's muscle of the orbit. Schreiber said that the narrowed palpebral fissure was not due entirely to the paralysis of the smooth muscle fibers of the upper lid, but also in part to the interruption of sympathetic impulses to similar tarsal fibers in the lower lid. He pointed out that the pupil was really an example of reciprocal innervation, the miosis being due to the unopposed action of the constrictor pupillæ. The hypotonus was in all probability caused by a decrease in vasomotor tone.

In conclusion, Dr. Lachman stated that in view of the rather constant finding of hemiatrophy and hemianhydrosis of the side of the face on which the lesion existed, and the hypotonus of the involved eye, these signs should be regarded as part of the classical syndrome.

Postencephalitic Parkinsonian syndrome

Dr. Irving J. Spear and Dr. Leo J. Goldbach presented this paper.

Dr. Spear opened with a broad general description of encephalitis, from the point of view of the neurologist. He traced the history of encephalitis, its association with epidemic influenza, its pathology, symptomatology, and prognosis. He stated that in many of the cases there might occur vertigo, nystagmus, pupillary irregularity, disturbance of pupillary reactions to light and accommodation, or paralysis of accommodation, choked disc, forced conjugate upward movements of the eyes, etc. Under the heading of sequelæ, he laid special emphasis on the Parkinsonian syndrome. He said that this was a slowly progressive condition which in most instances resulted in death in from five to ten years.

Dr. Goldbach stated that, in reviewing 110 case histories of lethargic encephalitis, 46 cases had shown various eye manifestations. These patients were seen in the Johns Hopkins Hospital dispensary. The ages ranged from 16 to 65 years, and the symptoms were more evident in males than in females. The various manifestations and the number of cases in which these were present were as follows:

Condition	Number of cases
ptosis	8
diplopia	5
nystagmus	8
anisocoria	13
incomplete convergence	8
Argyll Robertson pupil	3
ophthalmoplegia	2
photophobia	1
unequal accommodation	5
hyperemia of the fundus	2
disc haziness	8
low grade neuritis	2
retinal edema	2
bilateral choked disc	1
rotation limited	5

Aaron Robinson,
Secretary.

BALTIMORE CITY MEDICAL SOCIETY

Section on ophthalmology

February 28, 1929

Dr. Clyde A. Clapp presiding

Heterochromia iridis and cataract

Dr. Harry Gradle (by invitation) read a paper published in full in the American Journal of Ophthalmology (1929, v. 12, July).

Recession operation for strabismus

Dr. Conrad Berens (by invitation) presented this subject. He stated that since simple tenotomy and the various lengthening operations had not proved entirely satisfactory in the author's experience, ophthalmologists had turned to retroplacement. This operation had given accurate results not only in altering muscle action but also in diminishing the action of spasmodic muscles. In the treatment of strabismus, operation alone did not usually effect a cure. Before and after operating, therefore, a serious attempt was made to develop binocular single vision and stereopsis, to strengthen individual muscles, and to develop the use of amblyopic eyes.

(This paper appeared in full in the

September, 1929, issue of the American Journal of Ophthalmology.)

AARON A. ROBINSON,
Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 19, 1929

DR. W. HOLBROOK LOWELL presiding

Exophthalmos followed by paralysis of superior rectus

DR. H. B. C. RIEMER presented a widow aged forty-two years, telegraph operator, who had come for refraction May 25, 1922. With low correcting lens, vision in each eye was 20/15. She had a left hypophoria of four prism degrees. On December 8, 1926, she complained of edema of the left lower lid which appeared in the morning and lasted only a short time. It recurred periodically, usually preceded by a severe headache. Angioneurotic edema was considered at this time as a possible cause.

On January 22, 1927, the left hypophoria had increased to four and one-half prism degrees, and on April 16, 1927, to seven prism degrees. A blood Wassermann was negative, as was an x-ray plate. In spite of negative findings, iodide of potash was prescribed, increasing to sixty minims three times a day for three months, but without any change in the exophthalmos.

By April 28, 1927, left hypophoria had increased to 12.5 prism degrees; July eighteenth, to 20 prism degrees with complete paralysis of the left superior rectus. The exophthalmometer showed a difference of eight millimeters, the right eye measuring 18, the left 26. The left hypophoria continued to increase as follows: October 12, 1927, it reached 25 prism degrees; March 2, 1928, 35 prism degrees; January 25, 1929, 44 prism degrees. The refraction had not changed and vision was still 20/15 in each eye. The eye grounds and visual fields were normal. There was no enlargement of the blind spot. March 19, 1929, the exophthalmometer showed a difference of six millimeters, the right eye being about 16, the left 22.

Of the possible causes, meningioma was ruled out by negative x-ray findings. Lues was eliminated on account of negative Wassermann and of the use of KI without effect. Mucocele and orbital tumor could not be ruled out, although no tumor mass was palpable. Frequent consultations had been held on this case. Surgical interference had not been advised as long as there seemed to be no impairment of vision. The patient had recently been given twelve prism degrees divided between the two eyes, and appeared to be more comfortable with this addition to her glasses.

Recurring exophthalmos

DR. E. B. DUNPHY presented a girl, eleven years of age, who had come into the clinic on March 8, 1929, with an exophthalmos of the right eye. In April, 1926, she had had a cold, following which she was treated at the Boston City hospital for "abscess of the nose." She developed pneumonia, and about this time she also developed exophthalmos of the right eye. After ten weeks in the hospital she improved and was sent home. After four days symptoms returned and she complained of headache and vomited quite frequently. She was admitted to the Children's hospital in July, 1926, complaining of exophthalmos. There was soreness and redness of the right eye but no discharge; also there was a marked exophthalmos. The optic disc was normal. The patient was examined for tumor of the right maxillary antrum or abscess of the right orbit. An x-ray showed sinusitis chiefly on the right side, although there was some cloudiness of both antra and ethmoids. The laboratory notes were all negative. The white blood count, tuberculin test, and Wassermann were normal. The patient was discharged from the Children's hospital after the exophthalmos abated. It was then thought she had an orbital abscess on the right side, which had subsided without operation.

On March 8, 1929, she came to the Massachusetts Eye and Ear infirmary having had recurring exophthalmos of

the right eye for the past year. She showed normal fields and a normal optic disc. The right upper lid was quite red and there was a certain amount of tenderness at the orbital margin. The pupil was dilated on that side. An x-ray plate showed marked increase in density of the frontal bone, having the appearance of exostosis. The sinuses were all negative. During the examination of the eye about one-half hour previously, while the examiner was trying to feel for a tumor, the whole eye came out between the lids and was pushed back by the patient. The question arose what to do for her. With the exophthalmometer the right eye measured 25 mm. and the left 17 mm. Visual acuity was 20/30 in each eye.

Discussion. Dr. Joseph J. Skirball said he had seen this patient before she went to the Children's hospital. She was at the City hospital with a diagnosis of basilar hemorrhage. She had at that time paralysis of the sixth and fourth nerves. On account of the proptosis she was watched for seven or eight weeks, and she was discharged unimproved. She had a typical picture of orbital cellulitis. When she came out of the Children's hospital there was no proptosis of the eye. The present exophthalmos had come on since then.

Dr. Frederick H. Verhoeff advised giving KI internally and postponing the question of operation.

Unusual case of pigmentary degeneration of retina

For Dr. Derby, Dr. Paul A. Chandler presented a woman, fifty-four years of age, seen six weeks previously. The only complaint was that she had broken her glasses and wished to know if the lenses she was wearing were all right. On examination it was found she had a pigmentary degeneration of the retina in each eye. The vision of each eye was 5/6 with correction. The right eye had a full peripheral field with a ring scotoma around a ten degree central field. The left eye was reduced to a five degree central field. The discs were not waxy. The vessels in the left eye were distinctly larger than those in the right eye. She was one of a family of thirteen, and there was no other eye trouble in the family so far as she knew. No one else in the family wore glasses. In the right eye the light sense was within normal limits. In the left eye she could barely see the very strongest light used in making the light perception test.

Case of siderosis bulbi

Dr. Fred S. Thorne presented a man aged fifty-five years, who while pounding on a barrel a year ago had been hit in the right eye by a "spark." He was first seen at the Massacusetts Eye and Ear infirmary on February 27, 1929, when the right eye showed typical siderosis bulbi. The x-ray plate showed an intraocular foreign body. Vision was 12/200, and light projection "doubtful". On February twenty-eighth, Dr. Verhoeff made a magnet test which was negative. He therefore suggested removal of the lens in capsule, the idea being that perhaps later the foreign body might be seen and thus more easily extracted. A Verhoeff intracapsular operation was thereupon done by Dr. Thorne; the lens being removed without rupturing the capsule and no vitreous being lost. At the present time vision was shadows, the light projection was faulty, and the eye was considerably injected, so that enucleation rather than further operative procedure seemed indicated. A number of recent magnet tests had yielded negative results.

Discussion. Dr. H. B. C. Riemer described a case in which he removed a foreign body after siderosis had existed for two years. The man had then about 20/100 vision. Later the lens became cataractous and was removed, and with correcting lens the vision was 20/50. Since then, however, the vision had decreased so that now there was only shadow vision. Dr. Riemer asked if it was a rule that these eyes tended to go bad.

Dr. F. H. Verhoeff said that cases of siderosis bulbi had been reported in which vision was retained and the siderosis disappeared after removal of the foreign body. Often, however, the vi-

sion continued to deteriorate after removal of the foreign body, no doubt due to the fact that the vitreous was still loaded with iron. In the case presented by Dr. Thorne, the eye showed considerable reaction after the operation. The pupil contained a great deal of fibrin and the pupillary area was still so clouded that the fundus could not be seen. This probably explained the diminished vision. Marked siderosis always sooner or later caused irritation of the eye, especially of the iris, and if, the foreign body was not removed the eye must eventually be removed on account of the irritation.

Glioma of left frontal lobe

Dr. J. Herbert Waite presented the case of J.S.M., male aged fifty-six years, who for eighteen months had been subject to recurrent attacks of headache, vertigo, and vomiting, sufficient to require five different admissions to the Massachusetts General hospital. The important clinical findings were:

Eyes: visual acuity of 20/20 until the fifth admission, when it registered 20/40 in each eye. Papilledema varying between one and three diopters. Fields full peripherally, with enlarged blind spots. Neurological examination, except for eye, not remarkable; at times exaggerated reflexes; once noted tremor of right hand and arm. Lumbar puncture, done repeatedly, relieved symptoms for a time; fluid xanthochromic or bloody, containing 2,000 red blood corpuscles per cubic millimeter, and considerable protein; initial pressure 300 to 500 mm. water. Medical: blood pressure 155 systolic, 80 diastolic; blood Wassermann negative. X-ray of skull, slight calcification in left frontal region.

A diagnosis of spontaneous meningeal hemorrhage of unknown cause was made. Other possibilities were hemorrhagic pachymeningitis and tumor. An exploration was performed because the condition was growing worse and sight was failing. A large glioma, infiltrating the left cerebrum, was found and partly removed. The patient died within twelve hours.

Looking back over the history, with tumor in mind, it was found that on second admission there was a note about right reflexes being more active than left (patient was left-handed). On the fourth admission there was a note about tremor of the right arm and hand.

Case of trichiniasis

Dr. H. B. C. Riemer presented a man seen in the clinic with marked edema around the eyelids. There was slight chemosis of both lower culs-de-sacs. A differential count of the blood showed nineteen percent eosinophiles. The patient stated he had eaten fried pork chops nine days previously. There was no complaint of gastrointestinal disturbances or muscle pain, and no increase in temperature. Dr. Riemer felt there was no question but that this was a case of trichiniasis, and that the muscle pains would appear later.

Operation to prepare the socket for prothesis after exenteration of the orbit

Dr. F. H. Verhoeff presented a child, sixteen months old, in whose orbit an exenteration had previously been performed on account of intraocular sarcoma with extension outside of the globe. The lids with a small amount of conjunctiva were left. The socket was filled with fat over which the conjunctiva was sutured. Healing was as rapid as after a simple enucleation. After the operation the lids gradually sank in to a considerable extent, due to absorption of fat. About ten days ago Dr. Verhoeff had dissected up the conjunctiva and lids and had inserted into the cavity thus formed a large glass ball covered with a skin graft. The tissue in the socket was found to be porous, containing cavities filled with liquid fat. The graft had healed perfectly and a glass eye had been put in three days ago. A ptosis operation would be necessary later.

Two doubtful cases of pseudoneuritis

Dr. E. B. Dunphy described the first case as that of a man thirty-three years

old. About six months ago he had begun to have very severe frontal headaches and ringing in his ears. According to his history, this came on after seeing a man knocked down by an automobile. He was brought to the Peter Bent Brigham hospital, and was seen by Dr. Cushing, who was struck by the appearance of the eye grounds. Neurologically nothing was found. Lumbar puncture and Wassermann were done and everything was found negative. The patient was referred to Dr. Derby for an opinion about the eye grounds. He now had what appeared to be an elevation of the discs of about one diopter, with some engorgement of the blood vessels. The vision was 20/20 in each eye. The fields were normal. He had hypermetropia of at least two and one-half diopters in each eye. The question was whether the case was one of pseudoneuritis or of mild choking. Dr. Derby had made a note in February that the eyes showed hypermetropia and that there was normal vision in each eye, consistent with a low degree of choked disc. Whether it was congenital or pathological could be told only after a period of time.

The other case, in a man thirty-three years of age, had been seen about a year ago. He was in the hospital for two weeks following an automobile accident in February, 1928. After that he had diplopia and paresis of the right superior rectus muscle. The vision was 20/20 with normal fields. In March, 1928, he showed papilledema of one or two diopters in each eye, with some engorgement of the retinal vessels. He was watched all through the summer. X-ray of the skull was negative. Neurological examination was negative. A Hinton and Wassermann test was negative. Lumbar puncture showed nothing; there were no cells and no increased pressure. He had been seen this month with essentially the same findings: 20/20 vision, normal fields, normal blind spots. He still had this low degree of apparent choking of the disc. The question was whether he had always had it. He also had a hypermetropia of two diopters.

Discussion. Dr. David W. Wells said he had looked into the right eye of the first of Dr. Dunphy's cases and could see the disc with a plus two, and could not see any signs of inflammation. If the condition was the same in the other eye, he thought it might well be congenital.

Dr. E. E. Jack reported a case he had seen some fifteen or eighteen years ago, in a patient now about fifty years of age. She had had pseudoneuritis and he had seen her at short intervals since then. Some five years ago Dr. Cushing had operated upon her and had found a tumor. Dr. Jack thought the eye grounds would then change, but on seeing her shortly afterward he could make out no change at all. She had perfectly normal vision.

S. Judd Beach,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY

April 15, 1929

Dr. G. F. Suker, president

Contact glass in keratoconus

Dr. Dewey Katz presented a man, thirty-three years of age, who had come to Billings Memorial Hospital clinic about one month ago with complaint of gradually blurring vision over a period of five years. He had been refracted three times, the last time about nine weeks previously. Examination revealed bilateral keratoconus. Vision, R.E. 6/200; L.E. 3/200. R.E. —4.50 cyl. axis 90° = 0.3—1. L.E. —3.75 cyl. axis 90°=0.1. With contact glass and —3.00 sph., vision in R.E. = 0.82; L.E. with contact glass = 1.0—3. The patient was an elevated railway guard, and had been using the Zeiss contact glass in the left eye for eight hours daily, with only slight irritation at the end of that period. He was able to insert the glass without aid by keeping his head under water.

Papulous neuritis

Dr. P. C. Kronfeld presented a case of this rare but typical disease, which

had been described in 1926 by Adalbert Fuchs, as a severe specific inflammation of the head of the optic nerve and of the surrounding retina and choroid, characterized by formation of a large white exudate in front of the disc. The disease always occurred in secondary lues and was usually accompanied by other severe manifestations of secondary lues. This case showed a late stage of papulous neuritis; neuritic atrophy of the optic nerve; and, in front of retina and disc, a white membrane consisting of a thin layer of connective tissue extending with several fine strands into the periphery of the eye ground, where old choroidal lesions were seen. Dr. Kronfeld pointed out that this condition must be differentiated from retinitis proliferans, although the clinical picture in the later stages might be similar.

Shrunken eye socket

DR. HALLARD BEARD presented a young man who had come under observation about one week before with complaint of being unable to wear an artificial eye in a shrunken eye socket, the eye having been enucleated when he was a child. Under general anesthesia new upper and lower culs-de-sacs had been made, filled with softened dentists' modelling compound, which was pressed into the new socket. The lids closed well. It was intended to leave this plug in without graft, if possible, and, unless an unusual amount of shrinkage should occur, the patient could wear a prothesis of moderate size without difficulty. The mucous membrane from the lip would probably be the best graft in such a case, as skin would prove unsatisfactory on account of the growth of hair and continual desquamation. It was hoped that the epithelium would gradually close the defect left by opening the new culs-de-sacs, though it might be necessary later on to repeat the operation or to make a smaller plug.

Cyst of Krause's gland

DR. S. V. ABRAHAM presented a child who had a cyst of the upper fornix of the left eye, of at least two years duration. All the members of the family except this girl were under treatment for congenital lues. Following removal of the cyst, it was intended to make an examination to determine its origin.

Glaucoma

DR. GAIL R. SOPER showed a woman who had been under observation for about six months. When first seen the picture was typical, disc pale, with cupping, and pupils contracted to three millimeters. Tension R.E. 38, L.E. 35 mm. Hg. The tension decreased under pilocarpin. In September, 1928, it had risen to 44 mm. in each eye. Under eserin it dropped to R.E. 13.5, L.E. 15.5. In March, 1929, peripheral iridectomy was done in the left eye, with incision through the sclera. In the five weeks since, tension had varied from 12.5 to 26.5. The fields showed contracted red field almost to point of fixation in the left eye; and the same defect in the right eye, with some enlargement of the blind spot.

Bilateral persistent pupillary membrane

DR. M. L. FOLK showed a boy of fourteen years, whose vision in the right eye was $20/50 + 1$, with correction of $20/30 - 2$; left eye, 20/100, with correction 20/50. Examination of both irides showed a dense network of iris tissue occupying the nasal two-fifths of the pupil, and a fine web of tissue extending over the central portion of both pupils, of which Dr. Gradle and Dr. Von der Heydt had obtained stereophotographs. This boy had also another congenital anomaly, in that it had been necessary to construct an artificial anus.

DR. A. J. ST. GERMAINE presented four cases:

1. **Choked disc**
2. **Carcinoma of lacrimal gland**
3. **Multiple carcinoma**
4. **Blastomycosis of left eyelid**

Value of ocular symptoms in the treatment of intracranial lesions

DR. LOYAL E. DAVIS emphasized the importance of ophthalmological signs as the first presenting symptoms of intra-

cranial tumors. For convenience of discussion such symptoms were grouped into (1) cases presenting ptosis; (2) cases presenting loss of upward conjugate movements of the eyeballs; (3) cases presenting loss of vision without papilledema or characteristic field defects, exclusive of pituitary tumors; (4) cases presenting nystagmus or an isolated ocular nerve palsy.

A lantern slide demonstration of patients, specimens, and visual field charts was given. During this presentation various topics of neurosurgical importance were emphasized, such as the use of ventriculography, the important distinction between erosion of the posterior clinoid processes of the sella turcica from lesions without and from lesions within, the effect of decompression upon papilledema, the value of the blind spot following subsidence of papilledema, the pathology of intracranial tumors with particular reference to classification of the gliomas, and the use of the electric scalpel of Bovie.

The blind spot

DR. HARRY S. GRADLE and DR. SAMUEL J. MEYER read a paper on this subject.

Discussion on paper of Dr. Davis and on that of Drs. Gradle and Meyer.

DR. WILLIAM F. MONCREIFF commended Dr. Meyer for the brevity of his paper and for his close adherence to the subject. In some of these pathological conditions one should remember that blind spot changes were not the most significant changes found in the central fields, particularly in the early stages of tobacco amblyopia, and in most of the eclipse scotomas. In these conditions the entire central field should be explored. Accurate details of form and size of the smaller defects could best be obtained with the Bjerrum screen at a distance of one to two meters or even more, with test objects of small relative but greater absolute size. Under these conditions inaccuracies due to unsteady fixation and other factors of a psychological nature were reduced to a minimum as compared with campimeters using short radii.

Dr. Loyal Davis' contention that in papilledema the amount of swelling and its variations could be more accurately determined by examination of the blind spots than by opththalmoscopic measurement of the swelling in diopters might be considered from two different viewpoints. In the first place only the swelling at right angles to the axis of the nervehead produced changes whose subjective counterpoint was enlargement of the blind spot. Swelling in the anteroposterior or axial direction, most strikingly seen in the "mushroom type" of choked disc, caused in itself no enlargement of the blind spot. In the second place, the relative value of subjective and objective tests in each individual patient must be judged according to numerous factors, of which the general nature was well known. Subjective examinations might be impossible because of the patient's incapacity for cooperation in many cases in which information as to the amount of papilledema and its variations would be of especial importance. This would be true, for example, in many cases of head injury, brain abscess, or late stage tumors.

DR. DAVIS also asked Dr. Meyer's reasons for stating that the Lloyd stereocampimeter was less adequate for examination of the blind spot than for the fixation area and other parts of the central fields.

DR. P. C. KRONFELD said that the actual amount of swelling of the optic nerve in cases of choked disc could only be measured by estimating the height of the swelling as well as the size of the base of the swollen nerve. Both readings together would give an idea about the volume of the swollen disc. In certain cases the optic nerve projected two or three millimeters into the vitreous body without any enlargement of its base (normal blind spot) and in some other cases the ophthalmoscope showed very little swelling into the vitreous but markedly increased size of the disc. In such cases plotting of the blind spot would give the most valuable information.

DR. SIGMUND KRUMHOLZ said that in

cerebral tumors choked disc was largely produced by the mechanical effect of intracranial pressure. This conception was strongly favored by the fact that in a large percentage of this class of cases the papilledema receded to a varying degree after decompression. In some brain tumors the symptoms were mild in character, and changes in the optic discs were not definite, especially during the early stage of the lesion when surgical interference would be of most value. In doubtful cases it was his practice to have ocular findings checked by a competent ophthalmologist to determine as early as possible the intracranial pressure. Dr. Davis' cases emphasized that the location of the lesion was often pointed out by the ocular changes; for instance the case shown in which the eyes could not be raised beyond a horizontal level, plus anosmia. This syndrome practically located the tumor. He agreed with Dr. Davis that there were few diseases of the brain in which ophthalmological examination was not essential. In inflammatory diseases such as cerebral syphilis, and in degenerative diseases such as multiple sclerosis, careful examination of the eyes often helped in early diagnosis. In multiple sclerosis optic neuritis might be the only symptom for months or even years. It was important to bear in mind that it might be fleeting in character. In cerebral syphilis it was rather usual to find that ocular paralysis or other ocular changes were the only objective sign of brain involvement.

Dr. Roy Grinker agreed that ocular symptoms were most important to the neurologist, particularly in evaluating other symptoms present in intracranial lesions. At times the ocular signs might prove confusing, as in several examples which he cited; they should be considered only as part of the clinical picture. Optic nerve tumors were a special type of glioma (usually associated with peripheral cutaneous neurofibromas) arising in the optic foramen and early causing enlargement of the foramen which was visible by x-ray. Treatment should be by deep roentgen ray, as operative procedure, even simple decompression, invariably caused death by hyperthermia. Dr. Davis' statement, that in nonlocalizable tumor it mattered not at all whether a supratentorial tumor were decompressed subtentorially or vice versa, was objected to, based on Dr. Glinker's own experiment on dogs with artificial tumors of agar capsules. Even in unlocalizable tumors, the approximate position of the neoplasm in the cranial vault should be determined in order to decompress in a corresponding place. Naturally, exposure of the tumor was the optimum to be desired.

Dr. Harry Woodruff mentioned a case which presented some unusual symptoms, and upon which Dr. Davis might have an opinion. Instead of the symptom of ptosis which played such an important part in some of the cases reported by Dr. Davis, the opposite condition prevailed. After a very thorough examination no diagnosis had been made as to etiology. A woman beyond middle age, who had previously been operated upon for cataract and had made an uneventful recovery, later complained of failing vision, evidently due to vitreous opacities. She also developed retraction of both upper lids, resembling the eye symptom of exophthalmic goiter. She was diabetic and was under Dr. Woodyatt's care in Presbyterian hospital, but was returned without any explanation of the retraction of the lids. There was evidently something wrong with the sympathetic system, whereby Mueller's muscle was stimulated, thus producing the retraction.

Dr. H. B. Young said that when he got Peter's campimeter he thought his work would be simplified, but when he found that the scale drawing was exactly covered in his right eye and was too large for the left eye he was disenchanted. He cited a case which he had shown in 1906, of a girl with probable tumor of the base, whose fundi were almost perfect pictures of albuminuric retinitis. (For details see Ophthalmic Record, February, 1907). This

girl, with a good family history, and without reaction to specific treatment or diagnostic doses of tuberculin, finally responded to therapeutic administration of tuberculin, and was apparently well for five years, becoming robust. Then she went back to the previous condition, and she died before decompression could be done. Necropsy revealed an internal hydrocephalus, but the puzzling question was: why was it originally controlled by tuberculin?

DR. LOYAL DAVIS (closing) said that he was interested in studying the blind spot because this study afforded a more accurate method of determining the presence of papilledema. He had obtained better results by trying to measure the blind spot than by measuring the elevation of the disc with the ophthalmoscope. The interpretation of nystagmus was difficult. In patients who presented this condition, a record was made by means of a motion picture film, so that it was possible to get a group of such cases and to study the types carefully, thus verifying intracranial lesions. This had been a great aid. With regard to the question of decompression operations, it was manifestly unfair to introduce into a discussion anything which had not been taken up in the paper and he had said nothing about decompressions. A decompression was a palliative operation and to consider doing that in the presence of a tumor definitely localized would be folly. He could offer no explanation of Dr. Woodruff's case.

DR. SAMUEL J. MEYER (closing) said that his remarks on the Lloyd stereocampimeter were based on his own experience. This instrument had seldom been used in his practice during the past few years. A patient now under treatment had a central scotoma in one eye and no defect in the other. After an operation on the ethmoids the vision was checked up, and found to be about 1.2 in the good eye, and nothing could be found to account for this complaint of disturbed vision. Using the large Bjerrum screen at one-half meter distance, the eyes were still negative, but when the patient was six feet from the screen an enlargement of the blind spot was noted.

ROBERT VON DER HEYDT

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTOLARYNGOLOGICAL SOCIETY

April 17, 1929

Recent work on the visual pathways

DR. J. F. MCDONALD, professor of physiology at Creighton University medical college, reviewed especially the work of Brouwer and Zeeman. These investigators used the method of producing circumscribed retinal lesions in apes and after eighteen days following the degenerated nerve fibers by special staining methods. Their conception of the projection of the visual fibers in the external geniculate body, optic tract, and occipital cortex was shown by diagrams. This had been largely borne out by clinical evidence submitted by Gordon Holmes and others.

Discussion. DR. H. B. LEMERE asked whether it was true that there was a bilateral representation of the macular fibers.

DR. MCDONALD stated that this had not been definitely worked out but that apparently these fibers decussated in the same way as the other fibers, so that the temporal half of the retina was represented in the homolateral cortex and the nasal half of the macula in the contralateral cortex. If this was true, sparing of the macula in complete destruction of the visual pathways of one side did not occur. The reason for macular sparing in vascular lesions was to be found in the double blood supply of the visual cortex representing the macular area.

Ocular tularemia

DR. J. H. JUDD of Beatrice, Nebraska, reported two cases which will be published in full elsewhere.

Discussion. DR. HAROLD GIFFORD asked if it had been determined whether the bacillus described by Pascheff as the cause of conjunctivitis ne-

crotisans infectiosa was a different organism from bacillus tularensis. He remarked upon the similarity of ocular tularemia to Parinaud's conjunctivitis, the chief difference being the absence in the latter of the systemic symptoms such as high fever and generalized glandular enlargement. He mentioned a case of tularemia recently reported which was acquired from a muskrat.

DR. SANFORD GIFFORD mentioned a case of Parinaud's conjunctivitis in which a temperature of 100 degrees for two or three days was noted but in which there was no generalized glandular enlargement. He believed that Pascheff's organism and bacillus pseudotuberculosis rodentium described in similar cases by Herrenschwand were probably related to bacillus tularensis, although cultural differences had been described. He asked if any cases had been reported in domestic rabbits, as it was his impression that the disease occurred only in wild animals.

DR. JUDD, in closing, stated that Pascheff's organism grew readily on ordinary culture media, while bacillus tularensis required special media and was very difficult to grow. No cross agglutination tests with Pascheff's organism had been reported, so far as he knew. The disease did not affect domestic rabbits and had not been reported in Europe or anywhere outside of the United States except for one case from Japan. He believed the case acquired from a muskrat was due to the animal carrying infection from an infected rat, it being similar to a case in which a hog bite caused the disease, the hog having eaten infected rats.

S. R. Gifford,
Secretary

COLORADO OPHTHALMOLOGICAL SOCIETY

March 16, 1929

DR. WILLIAM T. BRINTON, presiding

Cyst of lacrimal gland

DR. MELVILLE BLACK exhibited Mr. A.B.F., aged forty-five years, who complained of a growth which had been present on his left upper eye lid for fifteen years. It was a rounded, protuberant mass with definitely circumscribed edges, situated over the outer half of the upper lid. The weight and size of the tumor prevented the patient from opening his eye. It appeared cystic, was clear on transillumination, and was thought to be connected with the lacrimal gland.

Discussion. DR. WILLIAM C. BANE recalled a similar but more extensive case in which the mass had developed after the use of Knapp roller forceps for trachoma. The mass was dissected off.

DR. FRANK R. SPENCER suggested the use of trichloracetic acid, either a 33-1/3 percent or a saturated solution.

DR. EDWARD R. NEEPER described a case much more extensive than the one shown. He felt that his case was not connected with the lacrimal gland. A simple incision was made and no recurrence followed.

Conjugate deviation to the right

DR. MELVILLE BLACK also showed a little girl aged three years, whose parents had observed that when the child was old enough to notice things she rotated her head to the left and turned her eyes to the right in fixation. When her head was held and she was asked to look at an object in the left field there was nystagmus in the horizontal plane. Nystagmus was actually present in all fields of fixation, but was fine, rapid, and scarcely noticeable when she looked to the extreme right. She had rounded shin bones and enlarged epitrochlear glands, and her front teeth were broader at the cutting edge than they were at the base. Under atropin retinoscopic examination revealed not more than one diopter of hypermetropia in each eye. The ophthalmoscope showed a normal fundus. It was thought that the child could recognize movements of the hand at twenty feet. The Wassermann test was negative.

Iritis with disciform corneal infiltrate

DR. WILLIAM C. BANE and WILLIAM M. BANE presented Mr. C. C., aged

twenty-six years, who had been first examined on February 16, 1929. He gave a history of having had an attack of influenza about one month previously. This was followed by an inflammation of the lids of the right eye which soon disappeared. The eye had seemed to him perfectly well until a few days previous to his first visit, when there developed photophobia, lacrimation, and tenderness on pressure. There was no pasting of the lids nor aching of the eye.

The vision of the right eye was 5/60, of the left 5/4. There was a roughened appearance of the epithelial layer of the cornea over an area about seven millimeters in diameter, commencing two millimeters above the center of the cornea and extending downward. There was a gray infiltrate five millimeters in diameter, extending from the roughened area deep into the substantia propria. The corneal surface did not stain, there was slight ciliary injection, and the pupil was small and active. There was no history of injury.

The sinuses were negative to transillumination. The nose was negative. The tonsils were buried and badly diseased. X-ray showed an abscess of the right upper first molar root, which was removed the day following.

By February twentieth, improvement in the eye was noticed, and gradually the opacity became smaller and less dense. The eye on this date had entirely overcome all irritability, and the second molar, which was also diseased, was extracted. The vision of the right eye on March sixteenth was 5/5. A little redness and photophobia persisted. A small gray disc could be seen with a few distinct deposits at its edge, on Descemet's membrane.

Discussion. Dr. Melville Black stated that twenty years ago the etiological factor in this case would certainly not have been recognized and he thought that such cases as this one proved conclusively the value of the removal of all foci of infection.

Dr. John A. McCaw referred to a case of iritis in which an apical abscess of the upper right third molar was clearly demonstrated by an x-ray picture. The patient refused to have the tooth extracted. After several weeks, consent was finally given for removal of the tooth. It was found that the root extended into the antrum and that the antrum was full of pus. The iritis cleared up shortly afterward.

Dr. Edward R. Neeper stated that in this sort of case, when the etiology was questionable or unknown, it was his practice to advise the removal of all dead or devitalized teeth, because experience had shown that a negative x-ray was not final.

Dr. William A. Sedwick mentioned a case in which mild inflammation and irritability of both eyes had subsided after extraction of two unerupted teeth.

Retinitis albuminurica

Dr. John A. McCaw showed Mr. W.G.S., aged fifty years. This patient was first examined on December 6, 1928, at which time he complained of failing vision for an indefinite period. His glasses had been changed several times during the past year by an optician. There was a history of diabetes of eight years duration, and it had been the patient's custom to test his urine for sugar and to regulate the carbohydrate intake accordingly. The vision of the right eye was 20/50, and of the left 20/200. With correcting lenses the right eye was improved to 20/20 and the left eye to 20/40.

The blood chemistry showed nonprotein nitrogen 60 mg. and blood sugar 192 mg. The urine had at no time shown any reducing sugar; there was some albumin, and granular casts. The consultant thought that the renal insufficiency was the most important consideration.

The retina of the right eye showed rather large white areas of exudation devoid of pigment, and located generally around the macular region. The lumen of the arteries was constricted and there were fresh hemorrhages, both round and flame-shaped. The retina of the left eye had changes similar to those

in the right, and in addition there were a number of quite small white exudations that followed the upper temporal vessels.

Inflammatory mass in eyelid

DR. DONALD H. O'ROURKE showed Mr. C.E.C., aged 37 years, a carpenter. He had never had any eye trouble of any kind until twelve weeks ago, when he noticed swelling and redness in the region of the right lower canaliculus. Although there was some tenderness on pressure he had very little distress and did not consult a physician for ten weeks. A diagnosis of chalazion was made and the swelling was incised. According to the physician's statement no necrotic or purulent material was encountered. At the end of another week the swelling and redness had increased and the part was quite inflamed and painful. Examination revealed a small tumor mass 10 by 5 mm., elevated, and occupying the mucocutaneous junction at the inner angle of the right lower lid. The larger portion was on the conjunctival surface. The lower punctum and canaliculus were involved. The punctum could not be seen. Epithelioma, streptothrix, and an inflammatory mass were considered in the diagnosis. (A later report of microscopic sections established the diagnosis of an inflammatory mass).

DONALD H. O'ROURKE,
Secretary.

ROYAL SOCIETY OF MEDICINE

Section of ophthalmology

June 14, 1929

MR. CYRIL WALKER, president

Velonoskiascopy

MISS MARGARET DOBSON said the principle of velonoskiascopy was as follows: When a point of light was fixed with one eye, an image of that point would be accurately focussed on the macula, and such a linear object as a fine wire, held vertically before the eye, would merely reduce the brightness of the image. But if the point of light was out of focus a diffusion circle was formed on the retina, and through the center of the diffusion circle the wire cast a vertical shadow having the same color as the background. The more out of focus was the point of light, the larger was the diffusion circle and the broader the shadow or interval caused by the wire. A vertical white line, when seen out of focus, could be regarded as a series of overlapping diffusion circles, and a wire would form a sharp dark shadow through the center of the blurred white line when placed vertically before the eye. The more the line was out of focus the broader would it appear, and the central shadow would become correspondingly wider.

By Lindner of Vienna and Trantas of Athens these facts were used as a subjective control after correcting errors of refraction by other methods. By means of diagrams the modus operandi was demonstrated. The speaker declared the test to be exceedingly accurate, and that this was true whether the patient was under atropin or not.

Ocular lesions in rabbits due to the administration of naphthalin

MISS DOROTHY R. ADAMS read a contribution which represented part of the research work being done for the committee of vision of the Medical Research Council. The production of lesions after the use of naphthalin was not a new discovery. Recent experimental work, such as that of Michail and Vancea in 1926 and 1927, suggested that the effects of naphthalin were due to a disturbance of the normal physiological functions of the body; and if that were so it had been thought that a study of this type of experimental cataract might lead to a better understanding of the etiology of human senile cataract, as the latter was probably due to some slow metabolic change. She had been able to study the three chief types of ocular lesions produced by this substance: (1) the occurrence of retinal exudates, (2) the development of cataract, (3) the deposition of crystals in the vitreous and retina. The naphtha-

lin was given to the rabbits as a solution in warm liquid paraffin by means of a stomach tube, repeated daily until ocular lesions began to appear. The time required varied, and seemed to be due to a difference in the resistance of the individual rabbits. Usually younger animals were the more susceptible. Retinal exudates commonly occurred as a primary change within twenty-four hours after a single dose of three grams. Typically, the exudates appeared as minute globules at the periphery of the retina and spread toward the center, at the same time increasing in size. Within the next twenty-four hours those at the periphery formed a confluent exudate, while there were still discrete circular or oval exudates round the disc. In a few days the whole retina became white and degenerate, and then detachment occurred. Sometimes there was a horizontal split across the retina above and below the disc, so that its detached peripheral areas floated forward into the vitreous, and a pigmented and degenerate choroid could be seen behind. In the early stages the exudates were transparent, and on ophthalmoscopic examination choroidal vessels could be seen through them. The retinal exudates always preceded the formation of visible opacities in the lens. After about twenty-four hours, clear striæ could be seen radiating from the periphery toward the center of the lens. On the second or third day these developed into a true opacity of the cortical fibers. A general haziness of the lens then ensued, and the opacity spread forward through the lens, involving the cortex before the nucleus. The final stage of the complete cataract was reached in about five days; the lens was then greyish-white and might develop a brown pigmentation.

The speaker had found that the deposition of crystals was essentially the result of repeated small doses of napthalin, and did not occur before the tenth day. It was never followed by the development of cataract, and in most cases was the only change to be seen in the eye; an animal which developed crystals did not show toxic signs. Typically, the crystals were seen first in the vitreous; later they might be deposited in masses on the retina. They were irregular double refractive four-sided plates, occurring in rosettes, as irregular clumps, or as overlapping plates. They displaced without injuring retinal tissues. They were inorganic, not naphthalin. It seemed that naphthalin produced its effects through a physiological disturbance rather than by direct toxic action.

Reported by H. Dickinson.

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TESTING FOR IRREGULAR ASTIGMATISM

When cylindrical lenses will not improve vision, we must not think that astigmatism has been fully studied and is not a factor in the case. A new interest in the contact glass, stimulated by the short paper from O'Rourke, reminds us that regular astigmatism is only one kind of astigmatism, and that all other kinds have been grouped under the term irregular astigmatism.

How much could be done and would be done for regular astigmatism was unknown to Thomas Young, when he found it in his own eye and called it "normal astigmatism". Thirty years later the mathematician and astronomer Airy proved that his own astigmatism could be corrected by a cylindrical lens; and when Donders had worked on the subject, after still another thirty years, astigmatism was found to be the most common and perhaps the most important error of refraction.

So little has been done in the study of irregular astigmatism that even the methods of testing it are unfamiliar and undeveloped. Skiascopy opened up the objective path of investigating it, but few skiascopists have shown interest in it. The first paper in English on the shadow test, by Lytton Forbes (Royal London Ophthalmic Hospital Reports, 1880, page 62) gave only confused impressions of phenomena not understood. The latest such communication, by Dr. H. T. Pi, of Peking, brings us again to a borderland of the unknown in ocular refraction. By skiascopy the refraction in different parts of the pupil is shown. But this is thought of chiefly as an obstacle to measuring regular astigmatism and spheric refraction.

The subjective tests of irregular astigmatism have been applied by individual investigators to their own eyes, but the reported results are widely scattered and wholly fragmentary.

Such testing of irregular astigmatism can be done in general by covering a part of the pupil. A disk having an

opening one or two millimeters in diameter, placed in front of a dilated pupil, may bring up the vision from 10/200 to 20/40. The pin-hole disc is often used to distinguish between poor vision from ametropia and that from other causes. Its effect may be as definite in high irregular astigmatism as in high myopia. A pin-hole disc moved about in front of a dilated pupil may quickly pick out the part of the cornea that gives the best vision, and so indicate the position at which an optical irridectomy will give the best result. By openings of various sizes one may find what size of pupil will give the best vision in a case of partial cataract.

The straight edge of a card moved across the pupil will show which part gives the least blurring and which the most. The corner of the card, either a right angle or cut to an acute angle, may be held before the pupil in different directions to find out just what part of a scarred cornea gives best vision and what part causes the most blurring. This is a very important test if one plans tattooing the cornea to improve vision.

For the irregular astigmatism of conical cornea, lens tests should be made with different sizes of pupil, produced by pilocarpin or euphthalmin; noting the size of pupil used with each correcting lens chosen, and the vision it gives. Many eyes with conical cornea can be kept useful, and further deterioration of vision prevented, by glasses thus chosen. Such tests may also indicate how much help is to be expected from a contact lens. Subjective tests for irregular astigmatism are useful only in a minority of the eyes we test for glasses. But in a few cases they are most valuable, and should be at the command of those who undertake to correct ocular refraction.

The subjective tests for irregular astigmatism give valuable results only with patients of superior intelligence, or who have been trained to understand what is expected of the test and to give definite answers. For the oculist to practice such tests on himself is important. Few are altogether free from irregular astigmatism in the dilated pupil. One can thus get a better understanding of the tests, and of the significance of statements made by a patient. An appreciation of the thing the patient tries to describe will always help in estimating the importance of his subjective symptoms. *Edward Jackson.*

THE PREJUDICE AGAINST SPECTACLES

When spectacles were invented in the thirteenth century, probably by Roger Bacon, their powers, as described by Bacon, were such as to be regarded as partaking of magic. Bacon ground lenses, one of which he sent to Pope Clement IV. But after the death of that pope he was condemned by the head of the Franciscan order for his teaching that science was greater than philosophy; and he was practically imprisoned in Paris from 1278 to 1292.

In medicine the authoritative teaching of one age reappears in the popular beliefs of a later period. With this in mind it is easy to see how some of the harmful and false beliefs about spectacles belong in the class of degenerated traditions. It was not only by the undeveloped minds of the thirteenth century, and by the infallible church worshiping the past, that spectacles were held to be a kind of magic. The medical profession, in rejecting all cures about which it knew nothing, rejected spectacles for the very conditions in which we now know they are most valuable.

When Samuel Pepys was thirty-six years old he discontinued the diary which he had already kept for nearly ten years, "a human document of amazing vitality" which is of great value as a history of his time. He did this after he had consulted doctors about an "increasing weakness of his eyes" which had been noticed for five years. He had found that glasses helped him, but the doctors all advised him not to use them, and predicted blindness if he did. That he had simply needed convex spectacles was proved afterward, when he was allowed to use them. As secretary of the Admiralty, when he was forty-

eight years old he visited Tangier to arrange for its evacuation. On this trip he kept a diary again; and "his last years were passed in correspondence with his friends." He died after reaching the age of seventy years.

The prejudice of Goethe against glasses, to which Dr. Crisp called attention on page 687 of the August issue of this Journal, may be simply an instance of the popular attitude toward them 150 years ago; although it may have been emphasized by his own myopia, allowing him to read without glasses as he grew older. Goethe did some writing on comparative anatomy and physiologic optics. But his great interest was in literature and in Greek art. Possibly there was a sort of patriotic resentment at the thought that Germans were nearsighted people. It is probable that Goethe's example and expressed opinions about glasses had a good deal to do with the failure to appreciate their full medical value in Germany, and so in other parts of the world that looked to Germany for leadership in ophthalmology. When Carl von Hess was in America in 1907 he remarked: "I wish we could get our patients to wear glasses like yours do in this country".

But the prejudice against glasses was not confined to Germany. In England Lawrence wrote in 1840: "It is probable that the defect may be confirmed by the habitual use of concave glasses, and even increased, if the nearsighted person employs those which gives him the clearest sight." In seventy-five years the ophthalmoscopic observations of the fundus lesions of myopia, and the case histories recorded by Foerster and others, have yet failed to convince some oculists that myopes should wear correcting glasses.

Donders encountered the same prejudice against wearing convex lenses for hyperopia as had harmed Pepys two hundred years before. In his Accommodation and Refraction of the Eye he quoted, and controverted by case histories, what standard authorities said about the use of glasses. Mackenzie (1833) had written: "Many injure their sight by the use of magnifiers suddenly, and before they have any need for them", and "in choosing convex glasses as in selecting concave ones, the lowest power, or longest focus, which answers the purpose is to be chosen."

Mackenzie quotes the case of a schoolboy who could not read ordinary type; but with his father's glasses, having a focus of nine and one half inches, could read the smallest print. He was not allowed to use spectacles, but was given calomel and rhubarb, senna and salts. "Exactly three weeks afterward his sight began to improve." Sichel (1845) wrote of convex glasses: "it is dangerous to use them too much or too strong." To hyperopes, who had already worn convex spectacles, "he did not hesitate to declare that the use of the glasses was the cause why they could not distinguish without such assistance, and already saw a dangerous amblyopia looming in the distance. He therefore unconditionally forbade the use of positive glasses for remote objects." "Even so late as 1853, White Cooper ('On near sight, aged sight, and impaired vision') describes the case of a girl aged eight years, who used a convex glass, and with it was enabled to work at the distance of a foot. He adds that her parents had both been obliged to wear convex glasses at the age of thirty (hereditary hyperopia); and still he could give the child no better advice than to refrain from the use of spectacles."

Donders, from his examination of such teachings and of the facts as presented by his patients, reached "the sad conviction that an incredible number of patients have been tormented with all sorts of remedies, and have been given over to painful anxiety, who would have found immediate relief and deliverance in suitable spectacles." The ophthalmologists of today, through experience in the correction of hyperopia, as Donders taught it, must all agree with his conclusions.

Thomas Young, who first recognized astigmatism in his own eye, regarded it as "normal". But Airy the astronomer, who noticed how in his left eye it

distorted the image of a star, calculated the lens needed; and went to an optician, Fuller of Ipswich, and had him make a cylindrical lens that corrected it. A clergyman of central New York, noting that his defective vision seemed to resemble that of Airy, worked out its amount and had McAllister, of Philadelphia, make a lens correcting it. Dr. Isaac Hays, learning of this, had lenses made correcting astigmatism of two of his patients. Dr. Goode of Cambridge, England, studied his own astigmatism in this way, and Chamblant of Paris furnished a planocylindrical lens to correct it. When Donders became interested in regular astigmatism he had planocylindrical lenses added to the trial case. The early cases he reported also seem to have been given correcting lenses. So, as it became known that eyes had such an optical defect as astigmatism, it also became known that cylindrical lenses could be made to correct it.

But the prejudice against glasses hindered their use for astigmatism, in the generally accepted judgment as to what amount of astigmatism should be met by the wearing of cylindrical lenses. As mentioned above, Young, who had 1.5 D. of astigmatism, regarded this amount as "normal" and did nothing for it. With such a standard many oculists decided that astigmatism should not be corrected if it did not markedly blur vision; and the battle as to how low a degree might cause eye-strain and how often it might be safely ignored has gone on to the present day. If a moderate amount of astigmatism is not worth correcting, slight changes in it need not be hunted out and compensated by a change in glasses, and inaccuracies of correction are of little importance. This attitude bred of the prejudice against glasses, still mars the optical treatment of ametropia for the relief of eye-strain.

Donders regarded astigmatism as being commonly a congenital anomaly; and so spread the inference that it did not usually change during life. This is quite the reverse of what experience shows is really the case. Airy found in his own person that it changed much in amount. But in this, as in many things, error having a start keeps the lead. Thus Gullstrand, in the third edition of Helmholtz' Physiological Optics, published in German in 1909 and in English in 1924, says: "In the typical cases of abnormal astigmatism the trouble is congenital and evidently dependent on static conditions in the development and growth of the eye. Acquired astigmatism (except that beginning in old age and the inverse astigmatism due to increase of pressure in glaucoma) occurs generally after illness and operations through the cornea."

It may seem strange that errors persist so long. But it is from our elders that we learn both truth and error. They shape our ideas more than we realize. We all incline to accept what has been accepted by others. Many minds still think that the older the authority the greater it is. This may be true in some things; but not in science, which learns from both the past and the present. Prejudice is not generally a matter of reason; but of desire, suggestion, custom, and imitation. It gives way slowly. Generations must use spectacles for benefits which are now only just beginning to be recognized, before prejudice can be overcome in a large proportion of even civilized and educated people. *Edward Jackson.*

ART, ASTIGMATISM, AND EL GRECO

It seems to be a doctrine of cubism, and of some modern artists who tolerate the cult, that one may make a drawing of half a dozen sticks criss-crossed in various directions, label the mystery "horse power", and so produce a noble work of imaginative art. Those among the general public, or even those of otherwise excellent artistic training, who fail to worship at this shrine are scorned as lacking "inner vision".

In the kind of corporeal vision with which the ophthalmic physician is most familiar, it has been argued that some of the abortions upon canvas which have made modern art galleries hideous must have been produced by persons

who suffered from visual defects so extreme as to render them incapable of seeing the world as it was known to the rest of humanity. While ocular defects may have given rise to some monstrosities of art which became accepted as masterpieces of eccentricity, it is perhaps more logical to suppose that in most cases the myopia or astigmatism was mental rather than physical.

Mannerisms have been common in all periods of artistic development. What we call individuality can hardly be dissociated, in the broad sense, from the possession of mannerisms. Perhaps the worst offenses of modern art represent in the main the desire to develop novel mannerisms by which the artist may become a vogue in professional circles and among wealthy patrons. But important mannerisms are to be found among "great masters" of former centuries.

There has been much controversy as to whether certain characteristics of the famous painter popularly known as El Greco (Theotocopuli, called El Greco because, although Spain was the land of his adoption, he was a native of Crete) were due to a high error of astigmatism. Most of El Greco's human figures are given exaggerated vertical dimensions at the expense of the horizontal.

The distinguished Spanish ophthalmologist Marquez has recently undertaken to put at rest any such suggestion (Archivos de Oftalmologia Hispano-Americanos, 1929, volume 29, page 249). Answering another Spanish writer who is quite convinced of the astigmatic factor in El Greco's work, he cites a number of authors in support of the contention that the subject (the person looking) does not see the retinal image but the object itself, and sees it as it is. He also calls attention (as has been done before) to certain features of El Greco's paintings which fail to support the belief that the great man had a high error of astigmatism with the rule.

One element in the strikingly original appearance of the paintings is that, instead of adhering to the accepted relationship between the size of the head and that of the rest of the body, namely a ratio of one to seven or eight, El Greco exaggerated this proportion at the expense of the head, sometimes reducing the latter to as little as one-twelfth of the length of the body. This was obviously not due to astigmatism, but must have been a part of a general plan to exaggerate certain dimensions at the expense of others.

In some paintings the exaggeration of proportions was confined to figures, the background being painted very correctly. In a few of El Greco's paintings the vertical elongation was much less pronounced than in others (as, for example, in a large sacred canvas recently displayed on loan in the art museum in Chicago); and, most important of all, it was sometimes employed horizontally (as in the hands of the figures) and sometimes obliquely.

Marquez further argues that El Greco's ability in the painting of detail was too great to support the belief that he was highly astigmatic; since the highly astigmatic eye does not see objects sufficiently in focus to make an accurate record of finer details. On the other hand a moderate astigmatism does not produce sufficient distortion to have any important effect upon the proportions of a painting.

Since El Greco sometimes elongated the details of his paintings vertically, sometimes obliquely, sometimes horizontally, and sometimes not at all, and since he often took other liberties in the matter of proportion which could have no connection with the existence of astigmatism, Marquez closes his argument by admitting that he is unable to explain why El Greco painted as he painted, and that the only incontestable reason so far advanced is that he chose to do so. *W. H. Crisp.*

BOOK NOTICES

Die Bedeutung der Tuberkulose für die entzündlichen Erkrankungen des Uvealtractus; Diagnosenstellung und Behandlung (The significance of tuberculosis for inflammatory diseases of the uveal tract; diagnostics and treat-

ment). By Dr. Josef Urbanek, university eye clinic in Vienna; with an introduction by Professor Dr. J. Meller. Octavo, paper covers, price marks 8.60, or for subscribers to the Zeitschrift für Augenheilkunde marks 7.00. 147 pages, 79 illustrations in the text.

Urbanek's monograph, published as a supplement to the Zeitschrift für Augenheilkunde, aims to establish the place of tuberculosis in the etiology of chronic uveitis. For this purpose five hundred cases of chronic uveitis observed in the First University Eye hospital of Vienna were subjected to a thorough clinical, serologic, and in part histologic investigation. A study of the facts thus accumulated has convinced the author that, in contradistinction to the "fibrinous" iridocyclitis which is often due to "focal" infection, the "serous" type of chronic uveitis is most frequently caused by tuberculosis. A detailed description of the clinical signs and symptoms of "serous" uveitis, including the earliest slit-lamp information, is followed by a discussion of the general methods of examination as applied in these cases to the confirmation of their tuberculous etiology. Particular stress is laid upon a roentgenologic study of the chest. Of the various tuberculin preparations employed for diagnostic tests, Toenneissen's tebeprotein is advocated because of its dependability and safety.

In a short chapter the author relates his experience in the treatment of tuberculous uveitis by specific immunization, by the use of heavy metals—salts of mercury, gold, iron, etc.—and by raytherapy.

Finally, in a supplement, numerous case histories are quoted to illustrate some diagnostic and therapeutic points which had been brought out in the first two parts.

The monograph will hardly settle entirely the controversial subject of the etiology of chronic uveitis. Those who do not consider themselves bound by a positive tuberculin reaction or who question the diagnostic significance of a favorable response to tuberculin treatment may find encouragement in the persistently negative results of the author's search for tubercle bacilli in his histopathologic work.

However, the large material studied by Urbanek, his generally cautious attitude, the completeness and thoroughness of the work carried out for several years, and most of all the discovery of tubercle bacilli in the blood of several patients afflicted with chronic uveitis, command serious attention to the author's views.

The book, an undoubtedly valuable contribution to the literature on tuberculosis of the eye, should find its place in the library of every German-reading ophthalmologist. It will also be of help to the internist whose cooperation is so often sought in the management of uveal lesions. *M. Beigelman.*

Twenty-five years of American medical activity on the Isthmus of Panama, 1904-1929: a triumph of preventive medicine. By Weston P. Chamberlain, Colonel, Medical Corps U. S. Army, chief health officer the Panama Canal. Octavo, paper covers, 74 pages, well illustrated, with excellent bibliography, including maps.

(Copies of this publication may be obtained by addressing The Panama Canal, Washington, D.C., or Balboa Heights, Canal Zone.)

It is to be hoped that this excellent monograph will find a wide circle of readers among the general public as well as in the medical profession. It illustrates the fact that the remarkable results obtained in the Canal zone have been due to intelligent and systematic organization, with industrious attention to details, in combination with a patient and ingenious series of clinical, climatological, and zoological observations.

The text is of a clear, readable, and sufficiently nontechnical character. It is divided into six parts: historical and introductory, the control of mosquito-borne diseases, the control of other

communicable diseases, existing health department institutions of the Panama Canal, organization of the health department and its cost, and bibliography with maps.

A few sentences from the historical section may be quoted. "Few Americans realize how old is the idea of a ship canal across the Isthmus of Panama . . . . In 1529 Alvara de Saevedra Ceron prepared plans for such a project. In 1534 Charles V of Spain directed Andagoya . . . . to determine the most advantageous route for an interoceanic canal. . . . . In 1616 Philip II caused plans to be prepared . . . . for a channel via the Gulf of Darien. In 1701 William Patterson, a Scotchman, recorded his conviction that a canal could be built." . . . . "By far the larger part of the morbidity and mortality formerly attributed to tropical climates was due" . . . . (to a variety of conditions). . . . "and, most important of all, to infection with specific parasites whose invasion is now almost entirely preventable."

W. H. Crisp.

Dark adaptation (a review of the literature), by Dorothy Adams. Number two of the reports of the Committee upon the Physiology of Vision, Medical Research Council. Paper covers, octavo 158 pages, including a reference list of 24 pages. Price five shillings net. London, Published by His Majesty's Stationery Office, 1929.

This extremely thorough and well written review of the literature of this important subject and of closely related topics is generously illustrated with graphs. It is divided into the following chapters: the perception of achromatic light stimuli and the general course of dark adaptation; 2, the perception of chromatic light stimuli; 3, regional variations in the sensitivity of the dark adapted retina; 4, dark adaptation at the fovea; 5, visual acuity and dark adaptation; 6, the difference threshold in relation to dark adaptation; 7, factors causing individual variations; 8, scotopic vision in relation to the stimulus; 9, certain subjective characteristics of scotopic vision; 10, dark adaptation in pathological conditions; 11, dark adaptation in animals; 12, structural changes accompanying dark adaptation; 13, chemical constitution of the retina, and the chemistry of visual purple; 14, electrical responses of the dark adapted retina; 15, external stimuli of the eyeball; 16, theories of dark adaptation.

This publication is likely for some time to come to be regarded as the most important reference work on dark adaptation. *W. H. Crisp.*

ABSTRACT DEPARTMENT

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases, including parasites
18. Hygiene, sociology, education and history

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2. THERAPEUTICS AND OPERATIONS

Benedict, W. L., and Rucker, C. W. **The use of foreign proteins in the treatment of diseases of the eye.** New Orleans Med. and Surg. Jour., 1929, v. 81, May, p. 782.

The authors discuss the antigenic properties of proteins, and say that proteins administered parenterally are probably diffused throughout the body, and set up chemical reactions within the body cells which in turn produce a ferment that stimulates antibody formation. They suggest that exfoliation of a large number of antibodies of another toxin when thrown into the blood stream may augment the action of whatever specific antibodies are already present. Typhoid vaccine, antidiphtheric serum, and especially milk were used. The results were good in primary uveitis, secondary uveitis, scleritis, choroiditis, penetrating injuries of the globe, and other miscellaneous lesions. Various deductions are offered. (Bibliography and discussion.)

Ralph W. Danielson.

Strebel, J. **Circumscribed or point anesthesia with cocaine in substance.** Schweiz. med. Woch., 1929, v. 59, June 8, p. 608.

With the object of securing prompter anesthesia and preventing the diffusion and the undesirable effects of cocaine in territory not subject to manipulation, the author recommends placing cocaine crystals or scales on the site of intervention, instead of solutions, for the removal of foreign bodies and other purposes where surface anesthesia is used.

M. Davidson.

Wölfflin, E. **A new prothesis for protecting the eye against roentgen ray lesions.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 813-817.

Renewed experiments with regard to the penetration of roentgen rays showed that the lead glass prothesis devised by Wölfflin twelve years ago let through a considerable number of rays. He therefore replaced them by shells of lead (1.1. to 1.4 mm.) plated with gold. These are light and flexible, and can be easily trimmed for the individual case. After instillation of cocain and before insertion both surfaces are covered with a salve of ten percent wax, ten percent paraffin, and eighty percent vaseline for excluding the secondary rays reflected from the anterior surface of the prothesis. For tumors of the iris a corresponding hole can be punched in the prothesis. The penetrability is rela-

tively slight, only 13.5 percent compared with 31 percent in the old model.
C. Zimmermann.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Birch-Hirschfeld. **High myopia and therapeutic abortion.** Zeit. f. Augenh., 1929, v. 68, June, p. 127.

A pregnant woman with progressive high myopia, with retinal and choroidal changes, noted that she had lost vision after each preceding pregnancy. The author recommended abortion to prevent complete blindness, which might be anticipated with reasonable certainty. A similar case occurred in his private practice, and more recently he had seen another one in his clinic.

He searched the literature of the past forty years but found little pertinent material. The larger monographs on myopia, the handbooks, the text books, and the monograph of Runge on obstetrics and ophthalmology make only vague mention of it. Only Mooren in 1908 thought that an acute anemia in pregnancy always stimulated high myopia to progress, a view with which the author does not agree. In 1919 Fejer described one case in which he had advised abortion.

Birch-Hirschfeld emphasizes that it is necessary for this problem to be discussed, so that we may have some unanimity of opinion which will prevail, particularly when the opinion of more than one man is sought by a patient.
F. H. Haessler.

Bussy. **The influence of radiotherapy on the refraction of the young human eye.** Bull. de la Soc. d'Opht. de Lyon, 1927-28, v. 16, p. 66.

Three children from six to nine years of age were treated by "almost homeopathic doses" of the x-ray for grave interstitial keratitis. The corneas became fairly clear, but all three cases were found to have considerable hyperopia, which the author believed to be of lenticular origin depending on arrest of development. He suggests that if this theory be true one could use mild irradiation of the eyes in cases of progressive myopia in children with the object of arresting the malignant anomaly of refraction.
J. B. Thomas.

Csapody, I. **Molds of the anterior surface of the living eyeball for ordering contact glasses.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 818-822.

After experimenting with different substances the author found that exact molds of the living human eye could be made. Molten paraffin is poured into a glass cylinder, which separates the lids and fixates the eyeball. The temperature to which the anterior surface of the eyeball is raised is about fever temperature. The procedure is not disagreeable and is without danger for the patient. To prevent secondary deformation of the paraffin it must be hardened on the eyeball by cooling. By means of two molds of plaster of Paris from the paraffin negative the metal is shaped.
C. Zimmermann.

De Schweinitz, G. E. **Concerning headaches—being an essay of certain etiologic factors and on distinctive features and their mimicries.** Jour. Med. Assoc. Georgia, 1929, v. 18, Feb., p. 51.

This admirable dissertation on the general subject described in the title emphasizes that a case of chronic headache can be correctly diagnosed only by thorough examination; the practice of quickly and glibly labelling a given case as "typical" being deprecated. The author states that eye-strain is responsible for from thirty to sixty percent of headaches of functional origin.
Ralph W. Danielson.

Freeman, Ellis. **What does a test of visual acuity measure?** Arch. of Ophth., 1929, v. 2, Aug., pp. 48-56.

In this interesting discussion the author questions the usual test for visual acuity, and, while admitting that for practical purposes it is probably adequate, argues that by the standards of pure science it is far from accurate. He contends that it has been proved that the apparent size of an object does not depend upon the size of the visual angle. It has been shown by Aubert, in what

is now known as the Aubert-Förster phenomenon, that the resolving power of peripheral portions of the retina is greater by fifty percent for near objects than for distant ones, even though the visual angle subtended by either is identical. On the other hand, using a different method an exactly contrary result was obtained in the laboratories at Frankfurt-am-Main. Finally Jacobson has found that the size of the letter as perceived in foveal vision was not proportional to the distance at which it could be resolved. The author offers no answer to this problem.

M. H. Post.

Hecht, S., and Wolf, E. **The visual acuity of the honey bee.** Jour. of Gen. Phys., 1929, v. 12, July, p. 727.

This is a technical study in biophysics which deals mainly with the relation of illumination to visual acuity, the resolving power of the retina, and the arrangement of the ommatidia. It was found that bees responded by a characteristic reflex to a movement in their visual field. By special means it was possible to measure the resolving power or visual acuity of the eye. Under similar, maximal conditions, the fineness of resolution of the human eye is about one hundred times that of the bee. It was also determined that bees are astigmatic. In speaking of illumination the authors state that the intensity range over which the bee and the human eye function in relation to visual acuity is such that for each the maximum visual acuity is about fifty times the minimum. The visual acuity of the bee (as for the human) rises with intensity of illumination until at high intensities it is constant. (Bibliography.)

Ralph W. Danielson.

Poos, F. **The myopic problem.** Arch. of Ophth., 1929, v. 2, Aug., pp. 66-75.

The author considers the problem of the etiology of myopia on the bases of biological considerations, pathology, heredity, external influences, and hygienic conditions.

In conclusion he feels that none of the theories "quite settle the question". He is of opinion that intraocular pressure is an important factor.

M. H. Post.

Schläpfer, H. **Observations on the method of visual acuity testing in the Swiss army.** Schweiz. med. Woch., 1929, v. 59, April 6, p. 380.

The writer discusses Hegner's comparative study of Pflüger's "Haken" (old "E" figures), which are used in the Swiss army with Landolt's rings, and his finding that the former gives a visual acuity reading one fifth higher than the latter. He argues against Hegner's suggestion that the readings of the former be converted into the international Landolt scale to conform to scientific exactness, pointing out that the measurement of visual acuity is only relative and that greater importance should be attached to uniformity of illumination, which according to the author introduces greater discrepancies in army testing than any other factor.

M. Davidson.

Thomson, Ernest. **Note on the continuous employment over a period of years of solid atropin and cocaine for children's refraction.** Brit. Jour. Ophth., 1929, v. 13, July, p. 366.

The reporter has employed atropin for upward of fourteen years in refracting many thousands of school children's eyes, with very satisfactory results. The drug is used in tabloid form, each containing atropin hydrobromide 1/200 grain and cocaine 1/200 grain. If the accommodation is not paralysed in one to one and a half hours, atropin ointment is given for home use but omitted on the morning of examination, at which time a tabloid is administered. The method is simple, clean, and exact. The slightly greater expense of the drug in this form is offset by the expense of preparation of solution and the wastefulness of its use.

D. F. Harbridge.

4. OCULAR MOVEMENTS

Braun, George. **Ocular and surgical torticollis.** Med. Klinik, 1929, v. 25, April 12, p. 590.

The author reports three cases of torticollis and facial asymmetry with involvement of one of the oblique muscles of the eyes affected. He reviews the literature. Graefe noted a case in 1864, and reported that tenotomy of the inferior rectus muscle corrected the torticollis; and he reported other observations later. Knapp in 1874, Landolt in 1885, Duane, Posey, Kreis, Pick, and White have reported cases. In 1928 Bielschowsky reported the case of a seven-year-old child who had been treated with such orthopedic measures as plaster of Paris splint, and by operative measures on the sternocleidomastoid muscle, without help, and on whom tenotomy of the inferior oblique muscle was followed by spontaneous straightening of the head.

Beulah Cushman.

Key, Ben Witt. **Transplantation of the temporal half of the vertical recti tendons in a case of complete paralysis of the external rectus.** Arch. of Ophth., 1929, v. 2, Aug., pp. 39-47.

Transplantation of muscle tendons dates back to 1770. In 1889 Parinaud, and in 1898 Motais brought out their works on transplantation of the superior rectus tendon for ptosis. Since then numerous writers have practiced transplantation of a portion of the superior and inferior rectus tendon to the external rectus tendon.

The author reports a case of complete paralysis of the external rectus evidenced by a fixed position of convergence of forty-five degrees. The external rectus was resected according to the technique of Reese. After the sutures had been placed in this muscle, the superior rectus was dissected free and clamped and the temporal portion split away by sharp and blunt dissection. Following that, to quote the author, "the upper arm of the double or central suture of the resected external rectus was carried from without inward through the temporal border of the superior rectus tendon, and the upper wing suture was carried from without inward through the nasal border of the temporal half of the superior rectus: the temporal half of the superior rectus was then divided at its insertion. The inferior rectus was treated in a similar manner. The four sutures were not passed through the tendon stump of the external rectus. In the case reported, the upper half of the internal rectus was tenotomized. Cosmetically the result was good in fixation at thirty inches, but outward rotation was limited. This failure is probably due partly to adhesions, so that the slips from the superior and inferior recti act not from their insertions but from the point at which they are split from the body of the muscle, and partly to the fact that the innervation of the superior and inferior recti is not such as to result in their contraction in efforts at external rotation."

The author concludes with remarks regarding the case reported, and notes that the partial tenotomy should be performed before the sutures attaching the superior and inferior slips to the external rectus tendon have been tied. He also notes that the excision of these slips should not be completed until transplantation can be immediately carried out.

M. H. Post.

Litinsky, G. A. **On paradoxic strabismus.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 798-801. (2 ill.)

Litinsky analyzes a case of paretic divergent strabismus in a girl aged twenty years. It was primarily compensated by paralysis of the left abducens.

C. Zimmermann.

Schaeffer, H., and Blum, J. **Parinaud's syndrome.** Arch. d'Opht. 1929, v. 46, p. 351.

Parinaud's syndrome is defined as paralysis of vertical movement of the eyes which may be total or partial and may or may not be associated with paralysis of convergence. In the partial form it is a paralysis of function. There may be a vertical diplopia due to unequal affection of the two eyes or a crossed diplopia in which convergence is also affected. Because of the frequent presence of associated lesions of the third nerve, it is thought that the

lesion of Parinaud's syndrome is in the region of the nucleus of the third nerve. Due to lack of precise observations as to whether voluntary or involuntary movements are affected in cases reported, it is impossible to figure out the exact site of all lesions. There are probably several areas which, if affected, can give paralysis of vertical movement. This function is also represented in the occipital cortex, but the greater number of observations permits one to draw the conclusion that the lesion is most frequently in the region of the nucleus of the third nerves, where the fibers of association between the nucleomotor and reflex centers, associated or cortical, are interrupted. *M. F. Weymann.*

Sommer, I., and Yaskin, J. C. **Spontaneous nystagmus. Some practical clinical features, especially its occurrence with diplopia.** Arch. of Ophth., 1929, v. 2, Aug., pp. 57-65.

Nystagmus may be ocular, otic, or neural. Which of these forms of nystagmus is present can usually be determined by consideration of the following observations: (1) Type: A pure horizontal, vertical, or rotatory movement indicates a lesion of peripheral labyrinthine origin. (2) Direction: Direction of the quick component, or lack of direction, the latter of ocular origin. (3) Degree: First degree when the eye is turned toward the quick component. Second degree when looking straight forward. Third degree when occurring in the opposite direction from that in which the eyes are rotated. The third degree indicates a lesion of the brain stem or vestibular apparatus. (4) Frequency: The extremes are usually of ocular origin, while medium frequency indicates peripheral labryrinthine or central nystagmus. (5) Amplitude: Extremes indicate ocular origin, medium results from peripheral labyrinthine or central origin. (6) Associated or disassociated: The latter is always of ocular origin. (7) Permanency: That of brief duration is usually labryrinthine. Ocular begins in childhood, as a rule. Changeability is the result of central lesions.

Diplopia is absent in peripheral labyrinthine nystagmus, as it is displaced by dizziness. Ocular nystagmus is as a rule acquired early, and if diplopia ever was present it can not be recalled. It is not present in miner's nystagmus. Central nystagmus, on the other hand, in the acute stages in which dizziness does not occur and in chronic forms where suppression of one image has not been learned, is accompanied by diplopia. Indeed diplopia with nystagmus may be the first indication of disease of the central nervous system.

M. H. Post.

5. CONJUNCTIVA

Chrameloff, N. **The penetration of tubercle bacilli through an intact conjunctiva.** Russkii Opht. Jour., 1929, June, pp. 640-680.

The permeability of normal conjunctiva in regard to tubercle bacilli was studied in a series of experiments on guinea-pigs. An emulsion of tubercle bacilli of typus bovinus Vallée was used in various dilutions for instillation into the conjunctival sac. This was followed in all cases by generalized tuberculous infection.

The conjunctiva itself as a rule remained intact. Only in cases where large numbers of tubercle bacilli were introduced did tuberculous granulomata also develop in the conjunctiva.

M. Beigelman.

Pillat, A. **About the trachoma problem in China.** China Med. Jour., 1929, v. 43, Feb., p. 87.

In China trachoma is a menace to the population. Pillat agrees with Howard that twenty percent of the population of South and West China, and forty percent of that of North China, are afflicted. Fortunately, however, trachoma in China is on the whole of a relatively mild nature. In comparing methods of treatment, it is pointed out that means to control the disease will have to be mild to be practical, because of the equanimity with which the Chinese regard any disease that may befall them, and because of the ingrained distrust of

western medicine. The author believes that the copper treatment is the most practical, and he gives a plan for wholesale application by laymen. (Bibliography.) *Ralph W. Danielson.*

Rollet. **The increase in the number of trachoma cases in Lyon.** Bull. de la Soc. d'Opht. de Lyon, 1927-28, v. 16, p. 30.

In Lyon statistics prove clearly that there has been a progressive increase in the number of cases of trachoma. Before the war the proportion was 0.4 percent, while it reached 1.9 percent during the war and nearly four percent in 1924, when it was placed on the list of diseases to be reported and to be subjected to obligatory disinfection. Of the cases seeking treatment forty-five percent were immigrants from North Africa, twenty-six percent from Italy, and eighteen percent from Spain. Mention is made of the effective course long since adopted in America in classing trachoma among the contagious diseases, excluding affected immigrants, and returning them to their native land at the cost of the steamship companies which transported them to America. Canada and South America have adopted similar protective measures, and the writer pleads for some such action by the French authorities.

J. B. Thomas.

Rollet, J., and Chams. **Treatment of trachoma with chaulmoogra oil.** Bull. de la Soc. d'Ophth. de Lyon, 1927-28, v. 16, p. 43.

Sixteen cases are reported, the treatment consisting of vigorous rubbing of the lids with a cotton applicator dipped in the oil, with light applications to bulbar lesions followed at once by lavage with boiled water. The treatment is repeated every two or three days. In four cases the effects were "truly marvellous," but in others there occurred grave complications such as perforating ulcer of the cornea, "in spite of the oil". Other authors including Morax are quoted as having had uniform success with this treatment.

J. B. Thomas.

Tontscheff, S. **Treatment of spring catarrh with lactic acid.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 48-55.

Under cocain-adrenalin anesthesia the conjunctiva is touched with ten percent lactic acid, and then after from one to two minutes is irrigated with boric acid or salt solution, under protection of the cornea. The whole treatment lasts from fifteen to twenty days. Proliferations are curetted before the application of lactic acid. If the ocular conjunctiva is much affected, a peridectomy, from 1 to 1.5 cm. from the limbus, of the uppermost layer of the conjunctiva is made, and the wound dusted with xeroform. Every day the eye is washed and covered with a bandage. After about a week it has healed with epithelialization. Twelve out of nineteen patients (63.6 percent) were entirely cured. *C. Zimmermann.*

Wibaut, F. **Trachoma experiences at Amsterdam.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 721-732. (1 curve, 2 tables.)

While trachoma is rare in the Netherlands, a serious endemic has existed for fifty years at Amsterdam, affecting from thirty-five hundred to four thousand patients. It occurs almost exclusively among the Jews (ten percent of the total population), who live in a quarter of their own. Among the Christians there are only two less important foci in two different quarters inhabited by laborers. From 1914 to 1917 a commission studied the conditions and adopted measures by which the endemic has been diminished. These measures include especially the institution of trachoma polyclinics and investigation of conditions in the families. The author has been examining the school children since 1918 and gives his views as to the differential diagnosis of trachoma and follicular conjunctivitis. Inclusions were found regularly. The treatment consists in expression of the trachoma follicles, massage, and application of bichloride of mercury 1 to 500 and nitrate of silver one percent. Sulphate of copper is not used. The disease is propagated within the family (very little in

school), from the parents to the first born children, and then from the older to the younger children. Chronic trachoma is chiefly infectious in the acute incipient stages or acute exacerbations. No connection with scrofulous or lymphatic disposition was observed, and the part played by genital infection can only be slight. *C. Zimmermann.*

6. CORNEA AND SCLERA

Bietti, G., Jr. **Histological investigations and technical remarks on tattooing of the cornea with platinum chloride, gold chloride, and silver nitrate.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 741-751. (4 col. pl.)

Bietti found that the regeneration of the corneal epithelium after tattooing with platinum chloride generally took place within four days, and with the other metals within from five to six days. Gold chloride penetrates faster and deeper than platinum chloride. The impregnation with silver nitrate differs in different cases. The metal is deposited in the corneal cells and between the lamellæ, from which it migrates into the regenerated epithelium. The chief cause for decoloration is new formation of connective tissue in necrotic areas, which easily arise in leucomas on account of their lesser resistance and their greater tendency to formation of connective tissue. *C. Zimmermann.*

Genet, L. **Grill-like keratitis and nerve fibers of the cornea, examined in the living eye.** Bull. de la Soc. d'Opht. de Lyon, 1927-28, v. 16, p. 70.

The author reports two cases of this rare affection. He believes that the fine lines developing in the cornea are nerve filaments. Kleefeld has reported similar cases under the title of chronic edematous neuritis. Genet notes that the corneal lines do not at all resemble vascular arborizations. With the corneal microscope the medullary sheath of the axis cylinder of the nerve filaments appears to be considerably enlarged, and the enlargement progresses with the evolution of the disease. He has not been able to prove his theory by histologic examination. In discussion Jacqueau reported eight cases of the disease observed by him in one family, all developing from thirty-five years onward. Several of the patients have ultimately become almost blind. Treatment has been useless in all cases.

J. B. Thomas.

Hollos and Linskz. **The treatment of corneal disease with ultraviolet light.** Zeit. f. Augenh., 1929, v. 68, June, p. 151.

The authors applied to corneal lesions ultraviolet light therapy as it was developed in the clinic of Birch-Hirschfeld. Biological effect can only take place in a tissue which absorbs the rays to which it is exposed. The biological action of actinic rays can not as yet be precisely defined, and we must content ourselves with the knowledge that the rays can act as a stimulus to tissue activity, and that an overdose can produce paralysis of activity and even death. Substances like fluorescin, called sensitizers, can increase the effect of the rays. In a cornea with intact surface where these substances are not absorbed they are useless.

The first treatments may make not only the pain and the conjunctivitis but also the corneal manifestations worse. The opaque filtrated area becomes larger, becomes yellowish and cheesy, and by the third day presents the typical macroscopic picture of coagulation necrosis, and sequestration results. The process is strikingly like the healing of a typhoid ulcer in the intestine. As absolutely accurate focusing of the light is impossible, the surrounding region of the cornea becomes opaque. When the ulcer is clear fluorescin is used with the radiation to stimulate tissue proliferation and epithelialization.

The most striking results were obtained in serpent ulcer. Not by any means were all cases cured, but never before had scars in the healed cases been so small, flat, transparent, and sharply circumscribed. The treatment requires much patience. Though the light treatment stops progress of the ulcer it often takes a very long time until healing is complete. Hypopyon especially is very resistant. It may last

for weeks, and a few recent successful cases have led the authors to combine milk injections with their other treatment.

In a group of cases of scrofulous and eczematous keratitis one could not be sure whether it was the ultraviolet light treatment or general hygienic régime which was responsible for the result.

F. H. Haessler.

Katz, Dewey. **A localized area of calcareous degeneration in the sclera.** Arch. of Ophth., 1929, v. 2, July, pp. 30-38.

Generalized calcareous degeneration of the sclera in old age is not uncommon. The scleral lamellæ as a rule remain normal after removal of the lime salts. The author was able to find only one case of localized calcareous degeneration in the literature—that of Pagenstecher. That case was apparently one of glaucoma and calcification was found in the lens, choroid, and retina, as well as in the sclera. The author's case was also one of glaucoma, but differed from that of Pagenstecher in that calcification was found only in one small area of the sclera, and in an eye that had not otherwise become atrophic. The scleral tissue in the author's case was not cicatricial tissue. There was no previous or secondary inflammation. Both carbonate and phosphate of calcium were present and lay in the scleral bundles as well as between them. The process began with deposition of granules, complete imbibition of the scleral tissue with lime salts followed, and the destruction of the sclera resulted. The lack of reaction in the surrounding tissue was notable, and suggests that the deposition of calcium took place after necrosis of the sclera. The probabilities are that calcium carbonate composed about thirteen percent and calcium phosphate about eighty-seven percent, a ratio similar to that found in bone.

M. H. Post.

Klatshko, M. **The sensibility of the cornea in congenital ptosis.** Russkii Opht. Jour., 1929, June, pp. 714-722.

The author used Frey's technique in testing the corneal sensibility of fourteen patients afflicted with congenital ptosis of the eyelids. In five cases he found a partial anesthesia of the cornea which he attributes to a central lesion of the trigeminus. This loss of sensibility may be at times responsible for postoperative corneal ulcerations in the surgical treatment of ptosis.

M. Beigelman.

Knapp, Paul. **Further tattooing experiments.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 41-47.

In agreement with Krautbauer, Knapp found that by the addition of hydrazin hydrate a more intense staining could be obtained with the metal salts. Thus a decided brown can be produced with platinum chloride. He advises against the use of nitrate of silver, which in solutions of two percent gives good staining, on account of its causing irritation. Ten percent freshly prepared gold chloride applied on the palpebral conjunctiva and followed by instillation of hydrazin hydrate stained the membrane intensely black.

C. Zimmermann.

Löwenstein, A. **Cases, with histology and therapy, of lattice-shaped degeneration of the cornea.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 752-762. (6 ill.)

Two cases, in father and daughter, are described in detail. Like the nodular, lattice-shaped degeneration of the cornea is a family affection. In the father it occurred as a slowly progressive opacity without irritation. In the daughter violent inflammatory attacks were observed in an interesting cycle: first right sided migraine, then a very severe corneal affection resembling relapsing erosion, finally violent coryza. The whole course speaks for a crisis of the vascular nerves, perhaps from endrocrine disturbances, as the patient also showed a premenstrual scintillating scotoma with migraine, and ovarian tablets seemed to prevent the attacks. With the slit-lamp corneal nerves were seen entering into the fine grey lattice-shaped area, which suggests a neurogenous origin of the corneal af-

fection. It is not clear whether the affected nerves are fibers of the fifth or of the sympathetic nerves, but the presence of the latter in the cornea has not been proven. Teased out pieces showed acidophilous deposits on Bowman's membrane and basophilous granular impregnation under it. Treatment of family degeneration of the cornea has so far been without avail. To obtain an intense hyperemia daily massage with dionin-mercury salve and warm applications were ordered; in the father also roentgen rays, with some improvement. *C. Zimmermann.*

Reid, A. C. **Hypopyon ulcer of cornea.** Lancet, 1929, v. 2, July 13, p. 64.

Reid points out that corneal ulcer with pus in the anterior chamber is a dangerous condition: and he commends early opening of the anterior chamber by a special incision. Under cocain a small keratome incision is made, just inside the limbus, in the lower part of the cornea. A spatula is introduced, and with a special knife, like an old fashioned vaccination lancet, a vertical incision is made through the corneal substance, completing an inverted T. The first incision is best done facing the patient, the second from behind. The lens is protected and complete control of the eye obtained by the spatula. The wound has been reopened with a blunt instrument with the greatest ease, as long as twelve days after the original incision. Evacuation of the pus is not essential, but it should not be left in the wound. Among one hundred hospital cases seen at the Nottingham Eye infirmary, sixty-three were thus sectioned. Nine eyes were lost. Three out of thirty-three sectioned before the fourteenth day, and six out of thirty sectioned on the fifteenth day or later. In only five cases of the series did lens opacity result; this may have been caused by pus lying for weeks on a segment of iris and lens.

Edward Jackson.

Rollet. **A typical case of zona ophthalmica.** Bull. de la Soc. d'Opht. de Lyon., 1927-28, v. 16, p. 34.

At times zona is unrecognized, at least in the early stages. The nasofrontal eruption, in spite of its unilateraality, may suggest erysipelas, and the patient may be referred to the contagious service of the clinic. Severe pain may be present in these unrecognized forms and may help to establish the diagnosis. The pain sometimes yields to radiotherapy. In the aged the prognosis should always be guarded.

J. B. Thomas.

Schindler, Emma. **The occurrence of persisting descemetocele.** Zeit. f. Augenh., 1929, v. 68, May, p. 22.

The author describes a descemetocele three millimeters in diameter and projecting two millimeters from the corneal surface in an eye which had been afflicted with recurrent episcleritis and recurrent corneal ulcers, diagnosed as rosacea keratitis. Four or five weeks elapsed between the first observation of a small dark spot in an ulcer and the full development of the thin walled dome. Despite the absence of increased intraocular tension, an iridectomy was performed to safeguard the eyeball against its possible occurrence with presumably disastrous effect. For ten months the eye had continued entirely comfortable and free from signs of irritation. The patient spontaneously observed the pulsatory phenomenon first described by Wagenmann in keratoconus. A bright disc which she saw about a light moved rhythmically forward with the summit of the systolic wave of the radial pulse, and back again. (A beautiful stereophotograph illustrates the description.)

F. H. Haessler.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Musabeili, Uminissa-Chamm. **A case of corectopia.** Zeit. f. Augenh., 1929, v. 68, May, p. 20.

The pupil was a horizontal slit in the temporal side of the iris. Hippel's view as to the genesis and significance of the condition is briefly summarized.

F. H. Haessler.

Rauh, Walter. **Disciform choroidal change in the macular region in high myopia.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 68-73. (2 ill.)

At the temporal margin of the posterior staphyloma in each eye of a man aged fifty-seven years began a four disc diameter prominent disciform focus over which the veins showed an arched course. Whitish stripes and whitish and dark red patches were observed in its center. Vision of the right eye with minus 18.00 D. was 2/25, of the left with minus 20.00 D. 2/25. It reminded one of the disciform degeneration of the center of the retina described by Kuhnt and Junius, but differed from it by the preservation of the retina, as indicated by the preservation of central vision. Its prominence and the lack of other characteristics rendered sclerectasia unlikely. Most probably it was a congenital callosity of the choroid, leaving the retina intact. *C. Zimmermann.*

Reese, Algernon B. **Pigment deposit in the contraction furrows of the iris.** Arch. of Ophth., 1929, v. 2, July, pp. 27-29.

Glaucoma, trauma, inflammation, and necrotic melanosarcoma are the most common causes for dispersion of pigment in the eye. This pigment may be absorbed, ingested by lymphocytes, or distributed in various places as free pigment. When taken up by lymphocytes agglutination of the latter takes place, and these masses are deposited by convection currents on the endothelium of the cornea. Free pigment may act in a similar manner, but as a rule the masses are smaller and remain longer in suspension in the anterior chamber, finally being precipitated against the anterior surface of the iris. Here they naturally tend to gather in the contraction furrows. Such was the result of a wound of the cornea in a small boy whose case is reported by the author in a brief, nicely illustrated paper. *M. H. Post.*

Schöpfer, O. **Tuberculous metastatic ophthalmia.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 30-35. (2 ill.)

A man aged thirty-four years, who several years previously had twice suffered from hemoptysis, had for six weeks a painful inflammation of his right eye with rapid impairment of sight. Half of the anterior chamber was filled with bloody exudate, the iris was rusty brown, the pupil invisible, the tension increased. After enucleation the iris and ciliary body showed diffuse infiltration with lymphocytes. The optic disc anterior to the lamina cribrosa was occupied by a dense round cell infiltration and some typical giant cells, the retina was necrotic, the central vessels mostly obliterated by endothelial proliferation. The choroid was thickened by infiltration with lymphocytes. In the disc, the retina, and the outer parts of the vitreous, tubercle bacilli were found in immense quantities, but not in the uvea. The origin of the whole process was attributed to hematogenous metastasis in the papilla, bearing into the vitreous. The infiltrations of the uvea were considered secondary (toxic).

C. Zimmermann.

Ubaldo, A. R., and Ayuyao, C. D. **Sympathetic ophthalmia: report of a case.** Jour. Philippine Islands Med. Assoc., 1929, v. 9, p. 127.

On August 12, 1928, a thirteen-year-old boy fell on the sharp end of his scythe, causing a wound of the left eye. When seen three days later, the wound could be found in the region of the ciliary body, the eye was greatly inflamed, and a hyphema prevented a view of the iris. V.O.D., 6/6; V.O.S., light perception. Tension O.D., 28; tension O.S., 5 mm. (McLean). The left eye continued to improve, but by September 5, the right eye was slightly congested. The vision then was normal, but on September tenth the vision was 6/15. Photophobia, lacrimation, congestion, tenderness, and a thin opacity of the vitreous were noted. The left eye was enucleated the same day, but the right eye continued to degenerate, and a week later vision was reduced to mere light perception.

Ralph W. Danielson.

8. GLAUCOMA AND OCULAR TENSION

Krasso, Jlona. **On the possibility of influencing glaucoma by radiating the thyroid.** Zeit. f. Augenh., 1929, v. 68, June, p. 163.

In order to determine the relation of increased basal metabolism, or thyroid hyperfunction, and sympathicotonus to glaucoma the author examined thirty-one patients. In five of these increased basal metabolism and specific dynamic action of the food pointed to thyroid hyperfunction. Vasomotor hyperirritability was also present. In all five the general manifestations of hyperthyroid function were abolished by treatment, but in only two of them was there prolonged reduction of intraocular tension. In both of these cases excavation of the optic disc slightly increased tension, and field defects were the only signs of glaucoma. The other three had attacks of foggy vision and greatly increased tension. Possibly we may in future be able to pick out those cases of chronic glaucoma which are in some way related to thyroid hyperfunction. The fact that glaucoma is a disease of later life, while hyperthyroidism occurs at all ages, suggests that it may be a hypofunction of the sex glands that allows thyroid function to predominate.

F. H. Haessler.

Lénárd, E. **Modification of cyclodialysis.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 73-76. (3 ill.)

By the usual cyclodialysis the ciliary body is detached in the width of the spatula. This is a rather narrow canal which may soon close, so that the tension is not diminished. Lénárd therefore constructed a differently shaped spatula, which permits detaching the ciliary body much more widely. He obtained thereby normal tension in nine cases. *C. Zimmermann.*

Magitot, A. **Symptomalogy of glaucoma and the pathological problem.** Part 2. Ann. d'Ocul., 1929, June, v. 166, pp. 439-467.

This is the second of a series of papers by the same author on this subject. It is rather an extensive consideration of possible underlying factors. The fact that the glaucomatous eye is a sick eye in a sick body is accentuated and therefore the necessity of a general physical examination is stressed.

The frequent association of the disease with vascular lesions is considered, and by elimination of other probabilities and for other reasons the underlying cause is thought to be a lack of capillary permeability or at least some lesion of the venous system. *Lawrence Post.*

Mukerjee, S.K. **Glaucoma as a result of epidemic dropsy.** Calcutta Med. Jour., 1929, v. 23, March, p. 518.

This well prepared paper is based on the study of 253 cases of glaucoma occuring in patients with epidemic dropsy during the outbreak in August, 1926. Most of the cases came on during convalescence, especially among those who were constipated. The mediocre class of Hindus between the ages of twenty and forty years were most susceptible. Signs and symptoms were as one ordinarily finds, the special features being that the depth of the anterior chamber was usually normal, the pupils had normal contour, size, and reaction, and injection of the conjunctiva was not marked. Field findings were classical. The average tension was 70 to 100 mm. of Hg (McLean), with a tendency to great variability. Mukerjee believes the increased tension is due to damage of the capillaries of the ciliary body by some toxin. The assumed toxic substance seemed to be in some measure excreted by catharsis. Rather complete laboratory examination revealed nothing noteworthy. If the hygienic, medicinal, and dietetic treatment as outlined in the paper was unsuccessful, surgery was employed. Fifty-seven trephinings and two iridectomies were done. Only six surgical cases were not helped; most of these were advanced. Twice the scleral disc was lost in the anterior chamber and was not removed, with no untoward effects. A few cases buttonholed healed satisfactorily. Two cases developed opacity of the lens six months later. *Ralph W. Danielson.*

Terrien, F., and Veil, P. **Concerning certain so-called primary glaucoma.** Arch. d'Opht., 1929, v. 46, June, p. 333.

Attention is called to the large number of cases of simple glaucoma showing no gross signs of iritis, and which, when examined with the slit-lamp, show cells in the aqueous and precipitates upon the posterior corneal surface. The literature upon the subject is reviewed and seven personal observations are reported in detail. In these individuals there was hypertony which might have been diagnosed as primary simple glaucoma, but with the aid of the slit-lamp it was concluded that there was a cyclitis with hypertony. There was absence of pericorneal injection and of the other usual signs of cyclitis. In these cases it is questionable as to whether one should use mydriatics or miotics, but the writers used miotics. Surgery seems to be contraindicated, as the results reported are not satisfactory. Fistulizing wounds tend to close. General treatment with oxycyanide of mercury seems to increase the good results. It is the writers' opinion that if surgery is used one should try repeated paracentesis. *M. F. Weymann.*

9. CRYSTALLINE LENS

Axenfeld, T. **Canthotomy (external blepharotomy) in cataract operation.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 85-88.

In 1915 (Klin. M. f. Augenh., v. 54, p. 97), Axenfeld recommended external blepharotomy in cataract operation, for the special cases of narrow palpebral fissure and tight lids and for cases in which spreading of the lids draws the skin of the external canthus in front of the plane of incision. Since then he has performed this step more frequently and now almost always uses it, so that he has proved the usefulness of the procedure by a very large experience. Previous anesthesia and anemia produced by subcutaneous and intramuscular injection of novocain-adrenalin from the zygomatic region along the external canthus to the lateral end of the eyebrow is very important. It also produces akinesia of the orbicularis. The author never saw any ill effects from the operation. *C. Zimmermann.*

Blaisdell, E. R. **Sugar tolerance and hypertension in cataract patients.** New England Jour. Med., 1929, v. 200, April, p. 768.

Blaisdell mentions previous work done which showed high incidence of hyperglycemia with cataract. The author determined the blood pressure and sugar tolerance in one hundred cataract cases. That thirty-one patients had a blood pressure above 150 mm. is considered normal. Twelve percent showed faulty carbohydrate metabolism and the author concludes that the results obtained here, added to the reports from other clinics, indicate that the presence of low glucose tolerance and cataract in the same patient is more than a coincidence. The author further states that hypertension and low glucose tolerance do not seem to be contraindications for cataract operations, providing intelligent preoperative and postoperative treatment is carried out. In this series, there was no patient with delayed healing or postoperative hemorrhage. *Ralph W. Danielson.*

Feigenbaum, A. **Anterior lenticonus.** Klin. M. f. Augenh., 1929 v. 83, July, pp. 35-37. (2 ill.)

A boy aged ten and a half years presented in each eye a cone-shaped solid protuberance at the center of the anterior surface of the lens, from two to five millimeters at the base, in the layers of the lens which developed after embryonic life. The central skiascopic refraction called for minus 5.5 D., and the peripheral minus 1. D. After two years the anomaly of curvature had increased.

C. Zimmermann.

Law, F. W. **An enquiry into the occurrence and effects of vomiting after cataract extraction.** Brit. Jour. Ophth., 1929, v. 13, July, p. 358.

This reports on a series of 141 cases of uncomplicated senile cataract. In fifteen, or 10.6 percent, of the patients,

vomiting occurred. Twelve, or eighty percent, were females. Of the fifteen cases ill effects to the operated eye, as an apparent result of the vomiting, occurred in five cases, or 33.3 percent. Actual prolapse of the iris occurred in two cases, or 13.3 percent. In the majority of cases, vomiting occurs within three days. In the series of 141 cases, ten or 7.1 percent had a prolapsed iris for no discoverable reason. Twenty of the series were given a liberal breakfast. All the others were on a restricted diet. Not any of those on a liberal diet had vomiting. The investigation concludes that vomiting is not a serious complication and that very likely its frequency can be lessened by proper feeding.

D. F. Harbridge.

Lénárd, E. **Is canthotomy necessary for cataract operation on an enophthalmic eye?** Klin. M. f. Augenh., 1929 v. 83, July, pp. 82-84. (1 ill.)

This question is answered in the negative by the author, who prefers to pull the eyeball forward with a mouse-toothed forceps bent like an iridectomy forceps, which grasps the internal rectus. *C. Zimmermann.*

Mehlhose, Käthe. **Blood sugar content in cataract patients.** Klin. M. f. Augenh., 1929, v. 83, July pp. 97-102. (2 tables.)

In patients with senile cataract the blood sugar content was determined, and in ten the tolerance for grape sugar. The average of the blood sugar content was 0.078 gram percent, an increase above the upper normal limit (0.12 gram percent) was found only in three (6 percent). The urine of all these patients was free of sugar. The tolerance for grape sugar in all ten patients examined was normal. Hence an increase of blood sugar content in nondiabetic patients affected with senile cataract is relatively rare and the tolerance for grape sugar seems to be normal. At least increase of blood sugar content and defective sugar tolerance can not be an essential factor in the etiology of senile cataract and antidiabetic diet could not be expected to hinder its development. *C. Zimmermann.*

Meves, Hans. **Calcified lens demonstrated in vitro.** Zeit f. Augenh., 1929, v. 68, May, p. 30.

In 1919 a piece of metal struck the right eye of the twenty-six-year-old patient. A few days later he could not see. Recently he had noted headaches and diminution of vision in the left eye. No scar could be found in the right eye. A roentgenogram made to determine the possible presence of an intraocular foreign body revealed a totally calcified lens. Presumably the metal had perforated the right eye, resulting in phthisis bulbi. *F. H. Haessler.*

Nanhorya, H.B.D. **Analysis of a hundred cases of cataract extraction at the Raipur main hospital by Smith's method with a flap of conjunctiva.** Indian Med. Gaz., 1929, v. 64, April, p. 193.

The technique is described. Nine of the ten cases had slight, and one a large, escape of vitreous. Four had rupture of the lens capsule, one a prolapse of the iris, and one eye suppurated.

Ralph W. Danielson.

Rollet, J. **Cure of a child born blind.** Bull. de la Soc. d'Opht. de Lyon, 1927-28, v. 16, p. 51.

The author reports a study of a little girl six years and nine months old, born blind with complete congenital cataract in each eye. He gives a careful analysis of her behavior before and after removal of the cataracts. It was in the main similar to that of several published cases. Her reaction was not as in the case of Cheselden, a joyous emotion of light and of vision suddenly and fully given, but rather the sensation of painful astonishment and inability to comprehend, which has been noted by most observers. The eye, retina, and brain had to be educated. The rapid progress of the child after a few days of visual education justified a favorable prognosis. In discussion Jacqueau cited a similar case successfully operated on, in which there was absolutely no visual

recuperation. Another case was noted (that of Moreau) in which after a happy beginning the visual reeducation did not progress. *J. B. Thomas.*

10. RETINA AND VITREOUS

Abe, T. **Paresis of accommodation in central retinitis.** Klin M. f. Augenh., 1929, v. 83, July, pp. 56-67.

In Japan, more frequently than in Europe, a certain form of central retinitis is encountered, which differs from the syphilitic chorioretinitis of Foerster and from the relapsing central retinitis of Graefe. It appears as a diffuse opacity of macula and fine gray or yellowish spots. Aside from the visual disturbance, it always shows central scotoma, micropsia, and metamorphopsia. Nine cases are reported in detail. Vision was improved by convex lenses, but with recovery the hypermetropia gradually receded. From his experiments the author concludes that the transient hypermetropia is due to circumscribed bulging of the retina by diffuse exudative imbibition of the subretinal and intraretinal strata, and not to paresis of accommodation. The micropsia is probably also due to the retinal changes, and not to paresis of accommodation. Histological examinations could not be made. *C. Zimmermann.*

Anklesaria, M. D. **Detachment of the retina. A complete cure in a myopic case.** Indian Med. Gaz., 1929, v. 64, April, p. 186.

Anklesaria gives a review of the literature on the pathogenesis of different types of detachment. He then reports the case of an eighteen-year-old boy, seven diopters myopic, whose right retina became detached following school examinations. He was kept in bed, his eyes were bandaged, and he was given subconjunctival injections of hypertonic saline, as well as urotropin, potassium iodide, sodium salicylate, and salines orally. After six weeks the retina was reattached and vision was normal. Eleven months later the same refraction gave the same normal vision as previously. (Bibliography.)
Ralph W. Danielson.

Boente. **Metastatic melanoblastomas in the retina.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 732-740. (1 col. pl. 6 ill.)

After extirpation of a bluish black tumor of the skin of the right parietal bone a man aged forty-five years developed numerous small dark nodules in the skin of the head, followed by intense universal melanosarcomatosis, terminating fatally after three months. The choroid of both eyes showed extensive melanoblastomas, and the right retina two tumors in the perivascular lymph sheaths of the veins, an extremely rare occurrence of metastasis in the retina. Most likely the tumor cells of the metastasis in the optic nerve passed from the lymphatic system of the nerve into the perivascular lymphatic vessels of the retina. *C. Zimmermann.*

Ricaldoni, A., and Isola, A. A. **Congenital and familial syndrome characterized by adiposogenital dystrophy, retinitis pigmentosa, and polydactilism.** Arch. de Méd. des Enfants, 1929, v. 32, Jan., p. 27.

Case histories are given of four members of one family, two brothers and two sisters, whose parents were first cousins and whose four other brothers and sisters died in infancy from unascertained causes. All exhibited the syndrome indicated in the title. In all of them visual impairment appeared in early youth, and two also exhibited nystagmus. The author stresses the familial character of his cases as well as of the few cases reported heretofore.
M. Davidson.

Weintraub, Alfred. **Circumscribed transient edema of the macular region.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 806-808. (3 ill.)

Intense impairment of vision with positive scotoma occurred within a few days in the right eye of a man aged seventy years affected with latent lues. A large circumscribed greyish-yellow disc without elevation and abnormal reflexes at the macular region were made out. The condition subsided within a few days with restitution of vision. An absolute central scotoma

for all colors changed to a ring scotoma and then cleared entirely. The fundus showed sclerosis of the small retinal vessels, probably luetic, and which probably had caused the circumscribed edema at the macula.

C. Zimmermann.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Harris, H. B. **Retrobulbar neuritis caused by disease of the posterior paranasal sinuses.** The Ohio State Med. Jour., 1929, v. 25, May, p. 362.

Harris reviews the literature of the subject stressing the increased vulnerability with a small optic canal. The toxin and pressure theories of neuritis are discussed, and the symptoms are outlined. The author leans strongly to surgical intervention and concludes by saying that "in the presence of serious optic nerve disease not otherwise explained, even if the nose shows no signs and roentgen ray gives no certain information, it is the business of the surgeon to explore." Full discussion follows three case reports and the bibliography. *Ralph W. Danielson.*

Hogg, G. H. **Optic neuritis with whooping cough.** Med. Jour. Australia, 1929, v. 2, August 3, p. 160.

Hogg cites from the literature, six cases of optic neuritis or atrophy after whooping cough and he also recalls one case in a girl aged three years, which he had previously reported. The new case now reported was in a girl of three years and five months, seen in February, 1929. In September, 1928, she had whooping cough during which she was nervous, vomited a good deal, and had a definite objection to strong light and loud noises. In November she was not seeing properly, and by December she could not see her food. Previously her sight had apparently been normal. Her left eye was found quite blind, with the optic disc pale and atrophic. The right eye could see toys at one or two feet, but the field of vision was contracted. Its optic disc was pale and atrophic, but not shrunken like the left. The vision improved slightly, after two months treatment with strychnia. The atrophy appeared to be postneuritic. In most of the cases found in the literature, and designated optic neuritus, there had been recovery. *Edward Jackson.*

Law, F. W. **Optic neuritus in second eye following perforating wound and excision.** Brit. Jour. Ophth., 1929, v. 13, July, p. 364.

The first of the two cases reported was in a male aged twenty years. He had suffered a perforating wound of the cornea with adherent iris and injured lens. Vision of the left eye was normal. Curettement and dividing the iris adhesion were followed by only moderate reaction. About five months later the patient complained of blurred vision with moderate temporal pallor. All examinations proved negative. Sight was finally reduced to counting fingers.

The second case was in a female aged sixteen years who suffered a perforating wound of the left eye from a knife. The eye was removed five days later. The right eye was normal. Thirteen days later the patient complained of mistiness of vision. The disc was swollen, its edges blurred, and there was some circumpapillary retinal edema. Vision equalled counting fingers at twelve inches. About two months later the disc swelling had subsided. There was slight pallor and vision of 6/9. The possibility of involvement in the second eye being coincident was considered.

D. F. Harbridge.

12. VISUAL TRACTS AND CENTERS

Colden, Curt. **Simmonds' disease (dystrophia cachectico-genitalis) with ocular changes.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 769-775. (4 ill.)

Two cases are described, in a man aged thirty-three years, and in a woman aged twenty-nine years, with severe general cachexia, trophic disturbances, and absence of genital functions, progressive optic atrophy, bitemporal hemianopsia, and positive roentgen ray findings at the sella turcica. In the man the roentgen picture showed ill defined contours of the sella turcica, in the woman the sella was very much deep-

ened and enlarged, the dorsum sellæ entirely destroyed, the anterior clinoid processes rarified, and the posterior wall of the sphenoidal sinus attenuated. A benign tumor was assumed which had destroyed the substance of the anterior hypophyseal lobe and had caused the trophic disturbances and, by pressure on the chiasm, atrophy of the optic nerves.

C. Zimmermann.

Glikson, J. **Tumor of the hypophysis with pressure on the chiasm, and its treatment with novasural.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 829-830.

A woman aged twenty-eight years had atrophy of both optic nerves, temporal hemianopsia of the right eye, blindness of the left. Two years previously an enlargement of the sella turcica had been found by roentgen rays, and tumor of the hypophysis diagnosed. The vision was improved by six injections of novasurol 1.2 c.cm., which removed the congestive edema in the nerves and their sheaths to which, apart from the pressure of the tumor, the lesion was due.

C. Zimmermann.

Ingvar, Sven. **On the pathogenesis of the Argyll Robertson pupil.** Bull. Johns Hopkins Hospital, 1928, v. 43, p. 363.

One cannot do justice to this technical paper in an abstract. Briefly, it is a review of the literature and a personal explanation based on original research. Ingvar concludes in part that "we have to look for the pupillomotor pathways on the surface of the diencephalon. They take a surface route from the posterior part of the optic tract to the anterior commissure in front of the anterior quadrigeminal bodies. As the metaluetic and luetic meningitic processes produce successively developing marginal degenerations of the optic pathways, as also of the diencephalic parts of the whole, the pupillometer pathways must be injured at an early stage. The reflex immobility of the pupil is to be considered simply as a meningitic symtom." (Bibliography.)

Ralph W. Danielson.

13. EYEBALL AND ORBIT

Charamis, Jean S. **A case of hydatid cyst of the orbit.** Arch. d'Opht. 1929, v. 46, June, p. 362.

A man fifty years old stated that he had first noticed a drooping of the left upper lid and that after forty days the left eye had become proptosed quite markedly. At the time he was seen the exophthalmos was proceeding more slowly. He had at first had diplopia followed by the failure of vision, and when examined there was no light perception. There was a fluctuating mass under the upper lid, not adherent deeply or to the skin. There was no rotation upward, and the optic nerve showed complete atrophy. The right eye was normal. A diagnosis of hydatid cyst was made. The blood showed eosinophilia of seventeen percent. Exploratory puncture showed a clear fluid containing no hooklets. Complement fixation was negative. Upon opening the orbit a large cyst was found, which seemed to have developed in the region of the superior rectus muscle. This was easily removed, as was a second, smaller cyst which lay behind it. Typical hooklets were found in the cysts. The patient appeared quite well, except that there was complete ptosis and absence of elevation. He gained five kilograms in four months. In this case there was a total absence of pain.

M. F. Weymann.

Gougelmann, Pierre. **The fitting of artificial eyes.** Arch. of Opht. 1929, v. 2, Aug., pp. 76-79.

A small eye should be worn for about two weeks, then the full sized eye may be applied. Statistics show that one person in every three hundred in the United States loses an eye.

Gold ball implants make ideal sockets for filling up the cavity and producing mobility in the prothesis. Small balls are superior to large ones. Bone balls are also recommended. Fat implants are excellent and cause less trouble than gold balls.

A typical annoying defect is a drooping of the upper lid over the prothesis,

with the absence of the natural fold of the lid. This can not be overcome by any type of artificial eye.

Little real progress has been made in the manufacture of artificial eyes since the introduction of the reform eye. This did away with the uncomfortable shell eye, and permitted the use of a smaller prothesis, and gave greater mobility.

M. H. Post.

Neblett, H. C. **Acute cellulitis of the orbit.** Southern Med. and Surg., 1929, v. 91, June, p. 381.

A general discussion of cellulitis of the orbit is followed by three case reports. One case was secondary to an ulcer of the conjunctiva, one to an insect bite, and one to sinusitis. All recovered following deep incision, which Neblett recommends at any stage of the affection when local signs and general symptoms are of a great severity.

Ralph W. Danielson.

Reimers, Otto. **The use of fascia lata in the eye.** Zeit. f. Augenh., 1929, v. 68, May, p. 27.

Since Mylius reported three cases from the Hamburg clinic in which fascia lata had been used to line scleroplastic and keratoplastic conjunctival flaps, eight more cases have been successfully operated on by this method.

The technique of Kuhnt is followed. A piece of fascia lata is placed on the scleral or corneal defect, after the conjunctiva has been dissected from the sclera. The fascia is anchored by means of episcleral sutures and covered by the conjunctival flap; it heals into the eye without irritation. Only those cases are selected in which the ordinary conjunctival flap would presumably give insufficient protection to the eyeball.

F. H. Haessler.

Rønne, Henning. **The diagnosis of inflammatory exophthalmos in acute infectious disease.** Zeit. f. Augenh., 1929, v. 68, May, p. 1.

The great majority of cases of acute exophthalmos results from infection in and near the orbit. Aside from posttraumatic and metastatic orbital abscess and phlegmon, exophthalmos can be caused by inflammation: 1, in the eyeball; 2, in Tenon's capsule; 3, inflammation in the soft parts of the face; 4, of the orbital wall; 5, the cavernous sinus; 6, (the most important group) in the nasal accessory sinsues. The pathological processes in the orbit may be 1, collateral edema resulting from inflammation not in the orbit itself; 2, subperiosteal abscess; 3, orbital phelegmon and orbital thrombophletitis; 4, inflammation in Tenon's capsule.

For therapeutic reasons it is of utmost importance to distinguish these forms, though often there are transitional forms. Eight cases are described which the author observed himself and in which he assumes that only edema existed, because of complete healing with restitution of normal structure and function, without surgical intervention. The most striking symptom of severe orbital edema is swelling of the lids, which may be so severe as to prevent opening them, and almost always to prevent ophthalmoscopy. One must be careful to avoid overlooking an exophthalmos under the lid swelling. Severe chemosis of the conjunctiva forms a wall about the cornea and causes the lower fornix to protrude between the lids, where it becomes covered with a fibrinous membrane. The orbital edema can also to a high degree limit the excursion of the eyeball in all directions. Reduced vision has also been observed, though it cannot be used as a differential point. A mild orbital edema can occur with panophthalmitis, but aside from this the accessory sinuses are the commonest if not the only cause of pure inflammatory edema. One cannot however wait in a given case to find out whether it is one of orbital inflammation or orbital edema, because those cases of sinusitis which are complicated by orbital inflammation tend also to involve the meninges and must therefore be operated on immediately. Rønne is inclined to base his decision on the character of the sinus infection. When it is severe and acute one is justified in waiting. Immediate operation is indicated in chronic sinusitis. Subperiosteal abscess can be incised through the

orbital margin, and through the incision the necrotic bone or the sinus which is the primary seat of the inflammation may be curetted.

Intraorbital phlegmon or thrombophlebitis may be secondary to primary septic cavernous sinus thrombosis, and is then usually bilateral, although bilateral occurrence of orbital inflammation does not prove that it arises from the cavernous sinus.

F. H. Haessler.

Szokolik, E. **Vomiting (Aschner's symptom) and the treatment in tense hemorrhage into the orbit.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 778-780.

In three out of four cases of retrobulbar hemorrhage repeated vomiting and retardation of the pulse were observed. If this occurs after traumatism of the head its differential diagnosis from intracranial complications is important. The author explain this by the pressure of the retrobulbar hemorrhage or of a foreign body invading the orbit on branches of the fifth nerve, radiated to and irritating the nuclei of the pneumogastric. The symptom seems not to occur in phlegmon and tumors, apparently because swelling of the tissue develops slowly so that the fibers of the fifth nerve have time to adapt themselves to the pressure. As in a case of retrobulbar hemorrhage complete peripheral paralysis of the third and fourth nerves set in, the author attributes blindness in such cases of rapidly occurring pressure to pressure on the optic nerve. The treatment consists in immediate incision of the periorbita. If delayed for forty-eight hours it may be too late for restoration of vision.

C. Zimmermann.

Zimmerman, L. M. **Exophthalmos following operation for the relief of hyperthyroidism.** Amer. Jour. of Med. Sc. 1929, v. 178, July, p. 92.

In eight cases thyroidectomy for the relief of hyperthyroidism was followed by the development of exophthalmos. In every case the patients were completely relieved of their symptoms of hyperthyroidism, and the basal metabolic rate was brought to normal or below by surgical removal of the gland. In three of the patients the eye change was limited to one eye, in the remainder it was bilateral. The postoperative exophthalmos developed with a falling basal metabolic rate and was associated in most instances with subnormal metabolism and sometimes with frank myxedema. Thyroid medication or the withholding of it seemed to have no effect on the ocular changes. (Bibliography and one photograph.)

Ralph W. Danielson.

Zytovsky, M. L. **On remote results in operations for the removal of optic nerve tumors.** Russkii Opht. Jour., 1929, June, pp. 756-763.

In four cases, which had been diagnosed as retrobulbar optic nerve tumors, the author had the growths removed with preservation of the eyeball. One of these cases on subsequent histologic study proved to be a fibroma neuromatodes not connected with the optic nerve proper. Twelve years after operation the condition of the orbit in this case was worse than during the first few years; there was greater limitation of ocular movements, possibly because of slow recurrence of the tumor. Of the three optic nerve tumors, one removed by the use of Krönlein's method was diagnosed pathologically as a spindle-cell angiosarcoma. Sixteen years after operation there was no recurrence and the cosmetic result was good. In another case—a glioma of the optic nerve—the removal of the tumor was incomplete. However, no ill effect was observed in the following eighteen years: the appearance of the eye was satisfactory, and in time improved. The last case was one of glioma of the optic nerve in a four-year-old child. Two years after removal of the tumor intracranial involvement became evident. The early manifestation of this tumor—at the age of two years—and its rapid infiltrative growth indicated a higher degree of malignancy than in the usual type of optic nerve tumor. In cases of this kind removal of the neoplasm must

be most thorough, and no effort should be made to preserve the eyeball.

M. Beigelman.

14. EYELIDS AND LACRIMAL APPARATUS

Duverger, G. **Senile ectropion and entropion.** Arch. d'Opht., 1929, v. 46, June, p. 321.

True senile ectropion is due to relaxation of the tissues of the lower lid causing a lengthening of the free lid border. It can thus be cured by shortening the lid margin to bring it into contact with the globe. The operation described to obtain this result is removal of a V-shaped wedge of the entire thickness of the lower lid at the outer canthus. The base of the triangle is formed in the lower lid border, and is of such length that the shortening produced by closure of the wound will hold the lid in place. Where the conjunctival surface has become much thickened through exposure it should be touched with the galvanocautery to remove the exuberant tissue at the time of operation. The wound made by excision of the V is closed by three or four silk sutures.

True senile entropion is due to the same cause as senile ectropion, that is, relaxation of the lower lid along its free border. In the presence of a strong orbicularis, this relaxed lid may be turned in, and the irritation thus produced will cause spasm of the orbicularis, which will increase the entropion. The operation described for the cure of entropion is exactly the same as that described for the cure of ectropion with the addition of a skin incision, parallel to the lower lid border and five millimeters below it, extending almost the length of the lid. Through this incision the fibers of the orbicularis overlying the tarsus are excised. The skin wound is closed by three mattress sutures placed some millimeters from the edge of the incision so that the lid is slightly everted by them. These sutures are left eight to ten days. Very good illustrations accompany the article to show the operative procedure.

M. F. Weymann.

Goebel, D. **Temporary drainage of the lacrimal canal and its results in diseases of the tear sac.** Klin. M. f. Augenh., 1929, v. 83, July, pp. 77-82. (2 ill.)

After probing and stricturotomy a grooved probe is introduced into the lacrimal canal, and along this a thread of silk interwoven with India rubber, and both are carried out of the nose. A double silk thread is fastened to the rubberized thread, and is drawn into the canal from below upward. Both ends are tied over the back of the nose and fastened with adhesive plaster. The thread remains for about ten days. In all of ninety cases treated in this fashion the tear sac was on the day of discharge without purulent secretion and the canal could be easily syringed. The author recommends this method in every suppuration of the tear sac in which the original path can be found with the probe.

C. Zimmermann.

Goldfeder, A. E. **A new method, tarsoplasty with auricular cartilage, for curing cicatrical trachomatous entropion.** Klin. M. f. Augenh., 1929, June, v. 82, pp. 809-813. (3 ill.)

Under local anesthesia by injection of two percent novocain-adrenalin, the whole thickness of the tarsus is incised parallel to the lid border and the ciliary portion of the tarsus detached from the orbicularis. A piece of auricular cartilage, 2 mm. wide and 2.5 cm. long, is excised from the helix and transplanted into the tarsal wound. No sutures are required. In fifteen cases the operation gave excellent and permanent results.

C. Zimmermann.

Jess, A. **Lash completely imbedded in lid.** Klin. M. f. Augenh., 1929, v. 83, July, p. 47-48. (1 ill.)

The upper lid of a man aged nineteen years showed a small vertical ridge of the skin in which a lash, displaced upward, could be seen as a black stripe. After a small incision at the lid border the lash, 7.5 mm. long, was extracted.

C. Zimmermann.

Klatshko, M. **The sensibility of the cornea in congenital ptosis.** Russkii Opht. Jour., 1929, June, pp. 714-722. (See Section six, Cornea and sclera.)

Potiquet, H. **Plastic dacryocystorhinostomy.** Ann. d'Ocul., 1929, June, v. 166, pp. 470-486.

A report of 179 operations indicates ninety-two percent of successes, six percent partial successes, and two percent of failures. The principal causes of failure were atresia of the sac or nasal diseases. *Lawrence Post.*

Reuscher, E. **Inflammation of the lids from working on teakwood.** Klin. M. f. Augenh., 1929, v. 82, June, pp. 802-805. (1 ill.)

After carpenter work with teakwood a man aged twenty-one years noticed in the evening an intense dermatitis of the lids with swelling and itching, which disappeared within ten days. As this did not recur when the man resumed the same kind of work, the author assumed a desensitization by the first dermatitis.

C. Zimmermann.

NEWS ITEMS

News items should reach **Dr. Melville Black**, Metropolitan building, Denver, by the twelfth of the month.

Deaths

Dr. William Clark McKnight, New York, aged sixty-three years, died July eleventh of coronary thrombosis.

Miscellaneous

The medical staff of the Illinois state department of health has recently examined all school children in Mason county for physical defects. It is estimated that among the 1,125,000 children in the state 235,000 have some form of defective vision.

The Hungarian ministry of public welfare and labor offers a prize of 2,000 Swiss francs (about $400) for an independent work on the etiology of trachoma which indicates valuable progress in this field. Works already published are eligible for the competition. The jury of award will announce its decision not later than December 31, 1931. Essays should be addressed to Eye Clinic No. 1, Royal Hungarian Peter Pazmany University, Budapest VIII, Maria-Utca 39, not later than June 30, 1931.

Before the Arizona State Federation of Labor, Mr. Lewis H. Carris, managing director of the National Society for the Prevention of Blindness, read an address in which he emphasized "the fact that nearly all blindness is easily preventable, that sight once lost can never be restored, and that no financial award can really compensate for the loss of vision". Mr. Carris pointed out that, in addition to the hazards of the daily life of the average citizen, men and women in industrial occupations were confronted with the further dangers to sight which were to be found in the shop, factory, or other special surroundings, and he quoted the estimate that of the one hundred thousand blind persons in the United States fifteen thousand had lost their sight in occupational pursuits.

Personal

Dr. Roynold N. Berke, Saint Paul, has been assigned as fellow of the Mayo Foundation, majoring in ophthalmology.

Drs. Joseph W. Charles and Martin Hayward Post, Jr., of Saint Louis, were among those who attended the ophthalmological congress in Amsterdam.

During the last week of September and the first week of October, Dr. Edward Jackson gave a series of lectures on physiologic optics at the University of Minnesota.

Dr. Robert Sory, surgeon in charge of the Irvine-McDowell memorial hospital, Richmond, Kentucky, held several trachoma clinics in Perry, Leslie and Clay counties during the week of July twenty-sixth.

At the meeting of the Kansas City Society of Ophthalmology and Otolaryngology, October 7 to 11, Dr. W. C. Finnoff of Denver gave a demonstration of the histopathology of operative complications in the eye.

Dr. Alois Pampichler, who has been associated with Professor Lindner in the Second Eye Clinic in Vienna for the past four years, has begun a term of residency in the department of ophthalmology of the State University of Iowa hospital and college of medicine.